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ABSTRACT

This paper describes a survey to determine the impact on teaching and learning in education by teachers, library media specialists, and students participating in Bell Atlantic's "World School" Internet program in West Virginia schools. Teachers, library media specialists, and students with K-12 Access e-mail accounts participated in this survey. The survey was issued randomly and the results were accumulated. Graphs were constructed to show the opinions of the participating groups for each question. The Internet did have an impact on teaching and learning in education. Study respondents preferred to use the Internet for information retrieval above all other activities. Respondents also felt that the Internet was a great motivational tool for students. The use of the Internet is causing a revolution in education, changing the way students learn and modifying the delivery technique. Integrating the Internet within education removes the constraints of the classroom from West Virginia teachers, library media specialists, and students, and provides a new global world of educational resources. The positive impact of the Internet can only be achieved if teachers are adequately trained, the school has a precise direction, and the Internet activities are well-integrated into the curriculum. Appendices include the teacher and student surveys. (Contains 101 references.) (Author/SWC)

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ED 410 943

THE IMPACT OF THE INTERNET ON TEACHING AND LEARNING IN EDUCATION AS PERCEIVED BY TEACHERS, LIBRARY MEDIA SPECIALISTS, AND STUDENTS

A Thesis Presented to
the Faculty of the Graduate School of
Salem-Teikyo University

In Partial Fulfillment
of the Requirements for the Degree of
Master of Arts

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by
F. Christine Richards
November 1996

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ABSTRACT

The purpose of this study was to determine the impact on teaching and learning in education by teachers, library media specialists, and students participating in Bell Atlantic's 'World School' Internet program in West Virginia schools.

Teachers, library media specialists, and students with K-12 Access e-mail accounts participated in this survey. The survey was issued randomly and the results were accumulated. Graphs were constructed to show the opinions of the participating groups for each question.

The study found that the Internet did have an impact on teaching and learning in education as perceived by teachers, library media specialists, and students. The respondents preferred to use the Internet for information retrieval above all other activities. The respondents also felt that the Internet was a great motivational tool for students.

The study also indicates that the use of the Internet is causing a revolution in education, changing the way students learn and modifying the delivery technique. Integrating Internet within education removes the constraints of the classroom from West Virginia teachers, library media specialists, and students, and provides a new global world of educational resources.

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CHAPTER 1

The Problem And Its Setting

Introduction

According to Schurman, one of mankind's most common and driving goals has been the ever faster movement of information (92:80). Wiesenmayer notes that with each advancement in communications, paper and ink, the telegraph, the radio, the telephone, and the television, society has undergone dramatic changes (73:77). These new technologies were not merely new ways of transmitting information. It changed the nature of information itself.

The invention of personal computers and computer communications have made it possible for the world to be less isolated, approaching the "global village" age. To succeed in the information society teachers, library media specialists, and students must become part of the global information environment (48:np).

Kozma states that improvements in teaching and learning are at the heart of educational reform programs (56:np). Network-based projects have the potential of changing the structure of the educational system. Giagnocavo indicates that the Internet will have the greatest effect on the field of education that has been seen in decades, perhaps in all of history (6:vii).

Teachers, library media specialists, and students connected to the Internet have access to a broad array of

information, materials, and people not available in other ways. The wealth of knowledge in museums, libraries, research facilities will become accessible to the smallest, most rural schools (62:np).

This revolutionary flow of information forces educators to rethink the use of traditional learning paradigms.

Statement of the Problem

Three questions are addressed:

1. What is the impact of the Internet on teaching and education as perceived by teachers participating in Bell Atlantic's 'World School' program in West Virginia schools?

2. What is the impact of the Internet on teaching and education as perceived by library media specialists participating in Bell Atlantic's 'World School' program in West Virginia schools?

3. What is the impact of the Internet on learning and education as perceived by students participating in Bell Atlantic's 'World School' program in West Virginia schools?

Hypothesis

The Internet will have a significant impact on teaching and learning in education as perceived by by teachers, library media specialists, and students participating in Bell Atlantic's 'World School' program in West Virginia schools.

Purpose of the Study

This study will be conducted because of the increased interest in incorporating the use of the Internet into the

curriculum by teachers, library media specialists, and students. The problem studied in this thesis is the impact of the Internet on teaching and learning in education by teachers, library media specialists, and students using the Internet.

Significance/Importance

The importance of this study lies in the fact that little research or studies have been completed to determine if the Internet has changed the way teachers and library media specialists teach and the way students learn.

Assumptions

The following assumptions govern the in planning, implementation, and evaluation of this study:

1. An impact on teaching can be established by teachers using the Internet.
2. An impact on teaching can be established by library/media specialists using the Internet.
3. An impact on learning can be established by students using the Internet.
4. The survey was a valid instrument for the study.
5. Respondents to the survey answered the questions in a complete manner.
6. The sample is adequate in size.
7. The sample is typical of teachers, library media specialists and students.

Limitations

This study was limited to a random selection of two hundred and fifty teachers, thirty five library media specialists, and one hundred and fifty students with e-mail accounts from Bell Atlantic's World School Program in West Virginia schools.

No attempt was made to survey administrators or others who have e-mail accounts from Bell Atlantic's World School Program in West Virginia schools.

Definition of Terms

1. Analog computer. Device that measures using analog representation of data.

2. Anonymous FTP. A publicly-available Internet file site.

3. Backbone. High speed link that connects local area networks to wide area networks.

4. Boolean. Establish relationships among concepts or key elements in a topic.

5. Browsing. A type of computer software that enables the user to access information on the World Wide Web. Browsers can be text-only or graphical.

6. Central processing unit. CPU is the main processing mechanisms of a computer.

7. Chips. Tiny complex of electronic components and their connections that is produced in or on a small slice of silicon.

8. Communication highway. High-speed global communications network capable of carrying voice, data, video and other services around the world.

9. Database. A computer holding large amounts of information that can be searched by an Internet user.

10. Digital signal. Signals converted from analog to digital signal to binary codes that a computer can understand.

11. Digital video. Video converted into a series of 0's and 1's to be sent over networks.

12. Distance learning. Linking of a teacher and students on several geographic locations via technology that allows for interaction.

13. Domain. Part of an e-mail address after the @ character that identifies the name of the computer.

14. Download/upload. To download is to transfer a file from another compute to the user's computer. To upload is to send a file to another computer.

15. Electronic mail. E-Mail is a way to send computer-generated messages to others who also have access to e-mail on their host systems.

16. Electronic text. E-text are documents created in or converted to machine readable format.

17. Electronic superhighway. Another name for Internet.

18. File transfer protocol. FTP is a means of moving files from a remote host to either a local host or one's own computer, depending on the type of Internet access.

19. Host server. Computer system directly connected to the Internet that provides modem access to personal computers.

20. HTML. Hypertext markup language are commands in text documents on the World Wide Web.

21. Hypermedia. Documents on the World Wide Web that contain a variety of data types and not just plain text.

22. Hypertext. A highlighted world or graphic in a document that, when clicked upon, takes the user to a related piece of information on the Internet.

23. Internet. The global network of networks that connects users to hosts.

24. Internet Relay Chat. Interactive, real-time discussions between Internauts using text messages.

25. Java language. Commands for interactive hypermedia text found on the Internet.

26. Keyword. A word or words which can be searched for in documents or menus.

27. Listserv. A computer program that manages a mailing list.

28. Logon. To sign on to a computer system. Microprocessors

29. Modem. A computer peripheral device that allows the computer's digital data to be transferred to the

telephone system's nondigital equipment. Another modem at the receiving end of the connection reconverts the signal to digital data.

30. Multimedia. Files that contain different types of media such as pictures, sound, video, and animation.

31. National Information Infrastructure (NII). The official U.S. government name for the Internet and other computer networks. Commonly known as the Information Superhighway.

32. Navigate. Following one link to another on the Internet.

33. Network. A group of computers that are connected in some fashion.

34. Node. Any computer connected to a network.

35. On-line. When user is logged onto a computer through the modem.

36. Operating systems. A set of programs residing in ROM and/or on disk that controls communications between the components of the computer and the programs run by the computer.

37. Paradigm. An educational model or pattern.

38. Packet. Are small packages of data broken down to be transferred over the Internet.

39. PPP. Point-to-point protocol, a type of Internet connection that uses standard telephone lines and high-speed modems to achieve an intermediate level of data transmission.

40. Providers. A company, institution, or organization that allows others to use its computer hookup to access the Internet.

41. Remote access. Connecting to a remote machine using FTP to upload and download files between the local and remote machines.

42. Router. Provides a link from one network to another.

43. Shareware. A method of distributing software in which the potential buyer is allowed to install the software and try it for a limited time before paying for it.

44. SLIP. Serial line Internet protocol; an intermediate type for Internet connection that is faster than a dial-up connection but slower and less powerful than a direct connection.

45. TCP/IP protocol. Transmission Control Protocol/Internet Protocol are standards used to communicate between connected computers on networks and the Internet.

46. Tel-collaboration. Collaboration completed over networks such as the Internet.

47. Telnet. A program or service that allows one to connect to a remote computer and operate programs or access databases stored on that computer.

48. 32-bit address. The speed which data travels along the network.

49. UNIX. A computer operating system commonly used on the Internet.

50. URL. Uniform Resource Locator is a complete description of an item, containing the location of the item retrieved on the Internet.

51. USNET newsgroups. Are topic-oriented message bases that can be read and posted to.

52. Videoconferences. Allows several users to converse with one another over their terminals with sound and video.

53. Virtual reality. Computer simulations that use 3D graphics and devices to allow the user to interact with the simulation.

54. World Wide Web. WWW is a program that allows the user to browse the Internet using a hypertext-type interface.

CHAPTER 2

Review of Literature

Computer - Pre-History

According to the Bible, the first words ever spoken by a human being were names given to "all cattle, and to the fowl of the air, and to every beast of the field" (Genesis 2:20) by Adam the first man. And the first quoted words of the first man, were "this is now bone of my bones, and flesh of my flesh; she shall be called woman, because she was taken out of man" (Genesis 2:23) spoken just after God had created Eve, the first woman (9:3). The origin of language is subject to substantial speculation.

Early people sought the means by which to record language. Nomadic tribes moved from one place to another living off the land (5:58). The tribes drew and painted on cave walls, stones, trees, and animal hides to convey messages and used signs and symbols to designate tribe or ownership (21:np).

As tribes began to trade and knowledge expanded, the need for written information became necessary. Pictographic was the first form of writing in which symbols depict objects (21:np). Sumerians used this form of writing around 3000 to 2600 BC (3:58).

The Egyptians' need to record business transactions led to the discovery of the use of papyrus and calmus (early form of pen and paper) (3:58). Parchment, which was made from animal tissue, was discovered later (11:69). The

method of paper making was discovered in China around AD 105 (12:29). It took over a 1000 years before other countries adopted the use of paper (21:np). In 1440, Johann Gutenberg invented the first movable type of printing (11:93). Gutenberg's invention began to revolutionize and changed the way people lived and communicated (21:np).

With the invention of the printing press, it became possible to share the written word. However, people continued to search for better and faster ways to communicate (21:np). As civilization advanced, so did the means of communication. Telegraph wires replaced the pony express (33:np). In time, telephones linked people thousands of miles away from each other (32:np). Radio and television brought the world into people's living rooms.

Computer - History

From the beginning of time, humans have collected, stored, and shared information (5:56). The need for more efficient ways of gathering, recording, and handling information has led to the development of more complex tools to handle the process.

Writing tools made information sharing possible to a broader group of people in society. However, there was a need for recording devices to manipulate the data (5:60). The abacus, invented by the Chinese, was the first known computing device (17:14). It originated about 2600 BC (5:60). The abacus consist of rows of strings with beads that was used for adding, subtracting, multiplying,

dividing, and taking square roots. The abacus is still used throughout the world today (17:14).

John Napier invented and published the next distinct computing device in 1614, called the table of logarithms (5:61). "Napier's bones" was a primitive slide rule that would perform multiplication, division, and extraction of roots (17:14).

Using the concept of Napier's bones, Edmund Gunter, in 1620, put two logarithmic scales on two strips of wood. This is considered to be the first analog computer. It was able to perform multiplication and division by adding and subtracting (5:63).

Mechanical assistance for counting and computing have continued to develop over history. In 1642, Blaise Pascal invented the first mechanical calculating machine (7:7). The machine had a automatic method for carrying numbers (17:14). Twenty one years later, Gottfried Leibniz invented the Leibniz wheel, which could do multiplication by rapidly repeated addition (7:7).

This discovery led to the invention of a device that would be considered the first automation process. Joseph Marie Jacquard invented a device which would attach to a loom a series of cards with holes in them arranged to decide the pattern of the material (7:20). This invention validated that information could be stored on a card and could be translated into an infinite variety of patterns (3:43).

Using punched cards as a form of permanent memory, Charles Babbage invented the analytical engine in 1833 (4:13). Babbage's machine was capable of storing instructions, performing mathematical operations, transferring data through a system, and returning solutions to problems. Babbage is considered to be the true father of the computer (3:45). Later on Herman Hollerity applied the punched cards mechanics to sort the 1890 census (17:14).

An important contribution to the development of computers was made by George Boole in the mid 1800's. His Boolean algebra and logic system perform mathematical and logical operations using on the symbols 0 and 1 (7:37). This advance had a major effect on the development of computer logic and computer languages.

Edelhart asserts that as the end of the nineteenth century approached, the concept of a true computing machine was in place (3:47). By 1919 machines could sort data into columns and perform the functions of recording, calculating, and summarizing (5:63). Each generation of computers built upon the next generation that preceded it (3:54).

First Generation. The first generation of computers began in the late 1930's and ended in 1957 (10:xvii). In 1938, the president of IBM, Thomas J. Watson, assigned Clair D. Lake to design and build a machine for Harvard University (4:123). The Automatic Sequence Controlled Calculator Mark I was completed in 1944 (17:15). It was the first automatic calculating machine ever built.

The first electronic automatic computer to be built was the Electric Numerical Integrator and Computer (ENIAC) (17:14). The ENIAC was used for lengthy and repetitive calculation of ballistic tables. It was also used for types of scientific problems, weather prediction, atomic energy calculations, cosmic ray studies, thermal ignition, random-number studies and wind-tunnel design. The ENIAC was designed and built by J. Presper Eckert and John W. Mauchly at the Moore School of Electrical Engineering, University of Pennsylvania, in 1946 (4:132).

The Electronic Discrete Variable Automatic Computer (EDVAC) also was used to compute ballistic and weapon-systems evaluation problems. It was build in 1949 at the Moore School of Electrical Engineering (4:132). The Univac I was the world's first commercial data-processing computer and was used at the U.S. Bureau of Census. All of these machines used vacuum tubes, drum memories, and programming in machine code (8:xvii). The machines were huge, needed considerable power to run, and had to be repaired every few hours (17:15).

Fifteen computers had been built by 1950 (4:154). The idea of computer being a commercial project was beginning to take shape (4:162).

Second Generation. The second generation began in 1957 and ended around 1963 (10:xvii). Transistors were used instead of vacuum tubes (17:16). Information was stored in magnetic core memories (10:xvii). The computers were more

reliable, consumed less power, were smaller, produced less heat, and had much more storage capacity (10:xvii). The development of computer languages or programs led to a significant growth in the number of users (4:162).

Third Generation. The third generation began 1963 and lasted until 1971 (10:xvii). This generation of computers used microminiature circuits (17:16). New software for operating systems was developed during this time which enabled greater information storage and retrieval easier (10:xvii). Computers were being used more by the scientific and business community. Over two hundred machines were being developed by 80 different companies to meet the demand for new machines (4:162).

Fourth Generation. The fourth generation began in 1971 and lasted until early 1980's (10:xvii). Monolithic circuits and microprocessors were developed during this time period (5:59). Microprocessors made computers accessible to all communities of people in the workforce, in education, and even in the home (3:54).

Fifth Generation. The fifth generation of computers began in the early 1980's and lasted until 1989 (5:59). With the development of many new custom design chips, computers could process information at a greater speed (10:xviii). Programs sponsored by both the government and industry, made huge advances in the field of artificial intelligence (10:12).

Microcomputers gave rise to a new class of general-purpose machines called personal computers. These were small low cost computers that were designed to be used at an office, in a classroom, or at home for personal use (3:54).

Sixth Generation. The sixth generation or "Third Age" of computer development began in the early 1990's (19:np). Bill Gates' conclusion was that as the PC achieves each new level of power, it simply tends to eliminate other types of computers of similar performance (34:np).

The development of computing has progressed very rapidly in the 20th century. The use of computers in homes, schools and business would have been impossible a few decades ago. Huge machines that once filled rooms were unnecessary because most of the transistors that make up a computer's logic circuits can be placed on a simple sliver of silicon (10:xi).

DEC Alpha and the Silicon Graphics Cray-on-a-chip lead the way in the mid 1990's with the new generation of microprocessors (23:np). Gilder indicates the computer will allow users to interact with huge databases of digital video, tens of thousands of films, art exhibits, courseware, three-dimensional experiences and other possibilities limited only by an individual's creativity (23:np). The demand for computers to connect worldwide is setting the pace for computer design in the future.

There have also been dynamic advances in the complexity of the technology itself. Computers are hundreds of

thousands of times faster, more reliable, and more cost efficient than the Mark I (3:53).

Since civilization began, societies have collected, stored, and disseminated information. The computer can store every variety of information recorded by man and instantly recall it for use. Through space satellites and data communication links, all fields of information will be instantly available from any computer around the globe and automatically translated into the language of the user (17:2).

The Internet

The Internet is a worldwide collection of thousands of interconnected computer networks, which is used by approximately one million people daily (57:1). It is the greatest and most significant achievement in the history of mankind (10:XIX). The Internet is the first global forum and the first global library in which anyone, both private and public, can participate at any time (8:2).

History of the Internet. Samuel F. B. Morse invented the first electronic network. He used a simple code to transmit messages by electric pulses over a single wire (33:np). Forty years later Alexander Graham Bell invented the second electronic network, the telephone (32:np). It is a network of networks working together like the Internet (1:16).

The Internet was developed in 1969 to connect U.S. Defense Department network called the ARPAnet and various other radio and satellite networks (16:5). The ARPAnet was developed to allow researchers to login on a local computer and run programs located on remote computers (60:np). Its network was designed to support military research to see if it could withstand partial outages from bomb attacks and still function (57:2). The Internet became a decentralized network with data stored on each of the computers throughout the ARPAnet system (86:48).

ARPAnet became a tool for sharing information through file transfer, electronic mail, and interest-group mailing list (60:np). By December 1969, there were four nodes, in different locations (individual computers attached to a network) on the network. The University of Utah, University of California at Santa Barbara, University of California at Los Angeles, and Stanford Research Institute (SRI) International all shared information on the first network (16:5). By 1972 thirty-seven nodes or stations were connected together using ARPAnet to collaborate on projects and use e-mail to send messages (97:8).

To send messages on the network, the TCP/IP protocol was developed. The purpose of TCP/IP is to let different types of computers on different types of networks share information. The information is transmitted through a process called packet switching. The software converts the

message into packets at the source then reassembles them back into the message where the message was received (57:2).

The TCP/IP software can be used on any computer and is free to anyone who wants to use the protocol and connect to the Internet. The protocol enables the computer to connect to another computer on the Internet (8:40).

Connecting to the network did not require extra money to be spent by ARPAnet. Each node or individual who connected to ARPAnet has to meet certain financial requirements to receive services (97:9).

As the demand increased for Internet connection, new networks began to develop. In 1983 the military segment of ARPAnet broke away from the network and became MILNET. These two networks became the backbone to what is known today as the Internet (60:np).

BITNET (Because It's Time Network) and SCNET (Computer Science Network) were created in the early 1980's. BITNET connected IBM mainframes in university data centers to form multi-disciplinary functions. It also provides LISTSERV services to its users. CSNET provide networking for university, industry and government computer science research groups. In 1987, BITNET and CSNET merged to form the Corporation for Research and Educational Networking (CREN) (46:np).

One of the most significant of the newer networks began in 1984. The National Science Foundation developed the NSFNET network which provides a major backbone communication

service for the Internet (97:9). NSFNET goal was to build its five supercomputer centers and connect them to all universities and research institutions to share resources (16:8). The five supercomputer centers were placed in regions so universities could connect to the nearest center. Sharing supercomputers allowed each site to share data all across the United States (57:3).

The United States Congress approved a five-year, $2 billion project to add the National Research and Education Network in 1991 (97:12). NREN is the fastest network available today.

NASA, the National Institutes of Health, the Department of Energy, and many other government organizations joined the network to create additional backbone facilities. Because of this rapid growth, nodes were divided into geographical locations and grouped by six basic Internet domains: gov, mil, edu, com, org, and net (government, military, educational institutions, commercial, networks-served as gateways between networks) (97:10). Each domain name identifies the type of server the user is accessing (51:np).

Schools began to join the Internet in the late 1980's and early 1990's (1:18). Because of the rapid growth in new communications highways, toll roads had to be built to handle the traffic. Between Congress funding the building of the 'Electronic Superhighway' and businesses providing

private access, people and schools are able to reach the Internet in greater numbers, to use its resources (1:19).

During the late 1980's, Internet users and providers expanded internationally. The Internet is currently in over 150 countries (41:np). Because of government regulations, many countries have been banned from the network. Currently about 25% of all hosts on the Internet are located in European countries (57:8).

NORDUNET became the international backbone in Europe that provides connectivity for over one hundred thousand computers to a large number of networks in many countries (46:np).

Most of the Internet community has come from the U.S. Federal Government and has became a major part of the U.S. research infrastructure. The bulk of the system today is made up of private networking facilities in educational and research institutions, business and in government organizations worldwide (46:np).

The Internet had grown from one network, ARAPnet, in 1977 to one hundred networks in 1985, accessible across the country (60:np). By June 1991, over 4,000 networks have been connected to the Internet. An estimated 9,472,000 connections were reported in January 1996 with more nodes connecting daily (49:np)

Governing the Internet. The Internet is not owned or governed by any one individual or groups of people. There are many organizations, ranging from volunteer groups to

large corporations, that help run the Internet. The Internet Society (ISOC) has the ultimate authority to decide which direction the Internet should follow (57:5). The ISOC was created in 1992 to provide focus on the evolution of the Internet technology and to promote the use of the Internet for research, scholarly communication, and collaboration on a global level (55:np).

This group of volunteers comprise a combination of the entire Internet community and consist of individuals, corporations, non-profit organizations, and government agencies (72:np). The volunteers gave time to support and promote the aims of the Internet.

Architecture Board is a co-ordinating committee for Internet design, engineering, and management operates with the Internet Society. The IAB is a committee of researchers and professionals that set standards for the rest of the networks to use (57:5). It keeps track of various numbers that must remain unique to build a network infrastructure around the world. Each computer on the Internet has its own unique 32-bit address; no two computers have the same address (72:np).

Many separate organizations are needed to help set the standards of communications systems management. The Internet Society operates through its international Board of Trustees and its International Networking Conferences to develop country workshops. It also works through regional and local chapters which have various standards and

administrative bodies, committees, and secretarial directors. The Board of Trustees is headed by the executive director with the assistance of several officers, along with 18 individuals drawn from every region of the world (72:np).

Cooperation among so many individuals is what makes the Internet work. The Internet is a self governing body that works because users want it to work. Rules are understood and accepted if networks wish to be part of the Internet world (57:6).

Connection. Making the connection to the Internet requires four basic components. To access a remote host, a computer, a modem, a basic phone line, and some type of telecommunications software that turns the computer into a terminal is needed (18:31).

Computer requirements will depend on what method is used to access the Internet. Some providers require hardware to meet specific standards to run software applications (13:40).

A *modem* is needed to send and receive messages from one computer to another. It is a device that takes the digital signal sent from a computer, turns the signal into analog signals, and then sends it over the telephone line to another computer (18:31).

Basic phone lines will work for most online users. The lines need to be touchtone and not rotary dialing because computers can only recognize digital dialing language

(82:15). Call waiting features will disconnect online sessions.

Telecommunications software is needed to dial into an account. The software dials the modem number and enables the modem and computer to talk to each other (18:32). Online service providers have a special software package that is needed to access the system (15:11). Most microcomputers that are sold today provide some type of telecommunications capability that is needed to connect to the Internet.

Permanent connection, dial-in terminal connections, dial-in direct connections, and dial-in indirect connections are four basic methods of getting connected to the Internet.

Permanent connection allows the users computer to connect directly to a TCP/IP (Transmission Control Protocol/Internet Protocol) network that is part of the Internet (13:18). The service provider connects a router to a dedicated phone line and computers are connected to the router. Each user logs on directly to the Internet from the computer without dialing up to a host (13:19). Universities, schools and corporations typically access the Interent by using the permanent connection.

Dial-in terminal connections provides users space on someone else's host computer (27:112). With this type of service, all e-mail resides on the host server and users download messages from that point. Separate procedures are

needed to move files between the home computer and the host computer.

Another dial-in terminal connection is provided by a group called USENET. Two graduate students, in 1979, at Duke University created software that used UNIX operating systems to distribute news to any computer also using the UNIX language (28:31). Usenet is not part of the Internet but many individuals subscribe to newsgroups over the Internet. Internet access is not required to participate in group discussions.

USENET offers discussion and information on thousands of topics. Newsgroups are divided into eight basic categories:

*comp - topics that interest computer users, professionals and hobbyists.

*sci - discussions relating to research and practical knowledge of Science.

*misc - groups that can not be classified in any of the other headings.

*soc - groups addressing social issues.

*talk - groups debate any issue at hand.

*news - groups concerned with the network and software.

*rec - groups interested in arts, hobbies, and recreational activities.

*alt - alternative categories that not all sites receive because of the controversial discussion and information.

There are hundreds of newsgroups within each main category (28:np). The Internet host must subscribe to the newsgroups before users can access any particular group.

Another feature of newsgroups is called Internet Relay Chat. Live conversation about any topic is possible with anyone around the world. A Finnish college student developed the IRC in the late 1980s (15:915). He wanted to improve the quality of interactive communication on his local bulletin board.

Dial-in direct connections use SLIP (Serial Line Internet Protocol) or PPP (point-to-point) software to provide the user with direct access to the Internet backbone(27:112). A host is not required to access e-mail or to use any other Internet tools. All files transfer directly to the home computer without the aid of additional software or commands(15:96).

Indirect service providers offer the most common and easiest access to the Internet. An online service offers e-mail capabilities along with limited Internet access (82:17). Many service providers offer free dial-up software with free hours of use (19:np). Charges are added for each additional hour of use. Some network service providers offer local telephone numbers or even a toll-free number or numbers to keep cost down.

Online service like CompuServe, Delphi, America Online, and Prodigy provide a place for conversation, file transfer, and experimentation with new software (82:18).

Network Tools. Communication, remote access, browsing, and searching are the four network tools to use on the Internet. Accessing Internet resources depends of these services.

Communications or electronic mail (e-mail) is the most used of all Internet tools. E-mail is a fast, easy, and inexpensive way to communicate with other users around the world (8:21). Electronic letters and messages can be sent to anyone with an e-mail address within minutes (15:283).

Electronic journals (e-journal) is another type of electronic communication. E-journals require special types of software and hardware to receive the issues. Subscribers have the choice of receiving specific articles or whole issues (40:np).

Remote access allows computers to Telnet or FTP (File Transfer Protocol) into a remote computer directly through the Internet. Both were developed by the architects to allow easy sharing of software and research results (98:5). Each require the user to log-on to a remote host to transfer files.

Telnet is a protocol that uses a set of instructions by computers to explain how to transfer information from one local computer to another local computer (15:542). The advantage of using Telnet is that by allowing two programs to work cooperatively and exchange data over the Internet, the user can connect to a local provider and then connect to

a host anywhere in the world (8:20). This service expands the user's travel capabilities on the Internet.

FTP allows the transfer of files from one computer to another. Files may contain text, graphics, audio, video, or software. The service offered by many Internet hosts is called Anonymous FTP (15:566). Users log-on at the hosts server to up-load and down-load files without having an account on the machine. Other hosts require the user to have an account to transfer files (15:567).

Browsing tools make searching for a particular topic easier. These tools are very helpful so the user does not have to navigate aimlessly to locate information.

Gopher is a menu system navigation tool (8:430). Gopher started out as a distributed campus information service at the University of Minnesota, home of the Golden Gophers (54:np); hence 'go fer' things. The menus offer the user choices to link to other Gophers around the world. The information on the menus is organized by subject (98:6).

Gopher servers can be found at many university, companies, and other organizations. Each server carries information that is of interest to the local user (8:431). With thousands of Gopher servers available, locating information can be difficult.

Veronica (Very Easy Rodent-Oriented Net-wide Index to Computerized Archives) is an index system that can search topics in Gopherspace (13:262). Veronica collects information and builds an index of data from these menus.

Jughead (Jonzy's Universal Gopher Hierarchy Excavation And Display) is another type of Gopherspace indexing directory. Unlike Veronica, Jughead indexes only one particular Gopher site (15:638).

The *World Wide Web* (WWW or W3) is a wide-area hypermedia information retrieval initiative giving universal access to a large universe of documents (52.np). Hypermedia is an extension of hypertext that enables graphics, sound, video and other kinds of data to be accessed on the Internet. Tim Berners-Lee, a researcher at CERN (the European Laboratory for Particle Physics) created hypertext links to help research groups access and share information quickly (29:32).

Every link can be described and located by a URL (Uniform Resource Locator). URL's contain the complete address of a link which includes the host name, directory path, and file name (8:507).

Hypertext documents contain links or URL's that allow non-sequential access to other information links (98:6). Selected keywords within a document allow the user to jump automatically to another selection of text (1:20).

Hypertext documents contains formatted codes for titles, font sizes, images that allow the browser to display the data on-screen (15:679). The HTML (hypertext markup language) is a set of codes that describes how a document is structured on the WWW (15:680).

To access the WWW a browser is needed. A browser is an application that interprets and displays documents (15:678). Browsers can be either text-based or media-based depending on what type of terminal is being accessed.

Browsers like Mosaic and Netscape are used to access the WWW. Mosaic and Netscape have revolutionized information technology (68:np). The browsers enable WWW servers to communicate with each other (29:33).

Mosaic was created by Eric Bina who was first to use graphical links (81:35). Mosaic provides access to text and hypermedia documents. Hypermedia includes audio, graphics, and video files (68:np).

In 1994 another WWW browser was developed. Marc Andreessen created the Netscape Navigator (81:36). Like Mosaic, Netscape links documents and hypermedia using the hypertext method. Netscape and Mosaic are both shareware and is free to use by Internet users.

Web browsers have improved in the last two years. Over fifty Web Browsers are available for users to choose from (85:45). A new generation of Web Browsers will be replacing HTML language with Java language. HotJava programming language is not machine specific. Any independent computer using the Java language can access the Internet(50:np). HotJava browsers will incorporate underactivity and animation, making the Internet come alive (52:np).

Virtual reality will also be available on the Internet with the development of VRML (Virtual Reality Modeling

Language) language. VRML is a language used for multi-participant interactive simulations or virtual worlds networked via the global Internet and hyperlinked with the World Wide Web. The mission of VRML designers is to put humans at the center of the Internet (44:np).

Searching for information on the Internet can be difficult without the aid of searching tools. The Internet does not have one centralized library to search from. Tools such as Archie and WAIS help users dig through the Internet to locate documents of interest.

Archie was derived from the word archive (98:6). It searches for file names or directories at anonymous ftp sites (90:38). Ftp enables users to directly connect with other computers on the Internet and download files from that computer. There are many public archie servers located around the world each keeping track of Anonymous FTP host in their area (8:333). Archie servers can be accessed by telnet, e-mail, or Archie client services and all use the same basic commands (90:38).

WAIS (Wide Area Information Servers) is another tool that helps users to locate information on the Internet. Unlike Archie which only searches names of file and documents, WAIS searches through the text of articles and groups of files (90:68). Users enter key words to retrieve specific documents (8:478).

Telecommunications in Education

Telecommunications is the technology of communication by electronic transmission (35:np). It is the link that is connecting education to the world. As telecommunications begins its explosive growth, many schools are climbing on-line to access the Internet. Educators, media specialists, and students are beginning to link the future of education to that of the rest of the world (91:7).

The *1995 Survey of Advanced Telecommunications in U.S. Public Schools, K-12*, report, developed by The National Center for Education Statistics (NCES), shows that:

- Fifty percent of U.S. public Schools now have access to the Internet. This percentage was only 35 percent just one year ago.

- Secondary schools (65 percent) are more likely than elementary schools (46 percent) to be linked to the Internet (69:np).

The elementary and secondary school community is a growing population on the Internet. Classrooms benefit from the use of the Internet in that it expands resources by making information and people from all over the world available to students, teachers, and media specialists (80:6). Michael Parrish, distance learning coordinator at Guilford County Schools in North Carolina, believes "the power of the Internet lies in the number of resources available across geographic boundaries and the speed with

which it can be accessed and eventually distribute that information across the entire school system (96:93)."

The Internet provides opportunities for schools that were never thought possible before (75:75). The use of telecommunications opens the world up so the educational community has knowledge and information outside the computer (14:441).

The Internet brings access to information, data, images, and computer software into the classroom almost instantly (14:440). Schools can develop individual and group projects, collaboration, curriculum materials, and idea sharing not found in schools without Internet access (69:3). Telecomputing offers an efficient, effective means of finding and using many different audiences and environments to implement within the curriculum (65:np).

Educational Uses

When teachers and students are connected to the Internet, teaching and learning strategies change (89:74). Three primary educational uses of the Interent are: e-mail, group communication, and accessing remote sources (76:5). Information skills are necessary for citizens to be productive in the 21st century (48:1).

E-Mail. Electronic mail (E-mail) is one of the most used services on the Internet (15:283). The educational community around the world has discovered the value of e-mail as an educational resource (77:1). There are many educational applications and advantages of e-mail.

Educators can consult with colleagues across the country about curriculum, lesson plans, teaching experiences, technology (76:5), and students can exchange information about schools, different cultures, climates, and languages (6:226). Electronic mailing list, news groups, and file transfers are ways to share knowledge and resources (69:17).

Electronic mail list or bulletin boards are a private forum that provide the means for users to put-up and retrieve notices, establish a discussion about educational problems, initiate cooperative projects, and establish correspondence with others having similar interest and concerns (14:430).

There are many age-appropriate and topic-specific mailing lists offering information on many topics (6:229). Some mailing lists are provided by professional groups responding to student inquiries. Scientists and scholars can answer questions and provide classrooms with resources beyond textbooks and the individual teacher's expertise (74:79).

Newsgroups are centered around a particular topic involving millions of people from all over the world (8:158). Newsgroups follow the same principle as mailing lists, except that users do not receive individual messages in e-mail boxes. Anyone around the world can post or read messages (6:230). Newsgroups also provide the ability to

participate in professional conferences by linking people for collaboration and to exchange ideas (26:3).

Educators can select from hundreds of newsgroups concerning administration, policy, and the use of the Internet for teaching. Students can subscribe to newsgroups to interact globally with other students on specific topics (76:33).

LM_NET is a popular newsgroup used by Library/Media Specialist. Subscribers become a virtual community of a group of widely dispersed people with common interest, share problems and solutions, and work together on individual and group goals (76:31). The Internet's usefulness as a means of communication depends on having people to communicate with (20:2).

File Transfer can be used to share papers, reports, and files between the educational community (38:6). Valuable resources can be found at FTP (File Transfer Protocol) sites. Clip art, software programs, and full text books are available for downloading (6:233).

Through file transfer teachers can send curriculum materials to teachers; students can share information about communities and create special projects; and media specialists can locate information on educational topics (38:6).

Group Communication. On-line collaboration is a teaching and learning environment located within a computer-mediated communication system (79:59). Tel-collaboration

promotes on-line cooperation, problem-solving, cross-classroom projects, and collaborative inquiry (74:80).

The Internet offers ways to teach students how to both communicate and collaborate by connecting students with other classrooms around the world (42:np). It offers educators the opportunity to network with other groups, enhancing and sharing information and ideas (76:6).

Students participating in collaboration projects are motivated to communicate, and can encourage independence and openness that is important for students to achieve in the learning process (69:4). Best collaborative projects are designed to have students measure, collect, evaluate, write, read, publish, simulate, hypothesize, compare, debate, examine, investigate, organize, share, and report (42:np).

Discovering that people in other countries share the same interests and concerns can lead students to explore other places, customs, and ways of thinking (76:6). Collaborative learning becomes significant when students work together from different countries with varied cultures, histories, and socio-political beliefs (42:np).

When students communicate with other people in the world, an understanding and respect of cultural, political, environmental, geographic, and language similarities and differences develop (87:29). Communication between students on-line with different ethnic and racial backgrounds, brings about acceptance and understanding of countries (42:np).

Students become eager writers when the world becomes the audience (87:29). Researchers indicate that publishing students' work on the Internet encourages better writing skills (78:12). Research at the University of California, San Diego concluded that students demonstrated better writing skills when communicating on the Internet rather than for an evaluation (58:np).

Educators connected to networks, change the communication paradigm from local to worldwide sharing of ideas and information (88:40). Work groups from around the world can be created; previously this could not be done because of distance and cost (76:6).

WEB Associates (Naples, Fla.) conducted a survey for Texas Education Agency and reported that 58 percent of educators surveyed use the network to communicate ideas and projects on the Internet (88:44).

Teachers are using the Internet to redefine curriculum and to extend the classroom experience to a global experience. Many nationally known projects are being developed and implemented around the world (66:np).

The project, 'Global Schoolhouse' (GSH), connect schools and students nationally and internationally using the Internet. It was developed in 1985 by teachers in San Diego to connect with classrooms on the east coast. In 1992, the Global SchoolNet Foundation created the official Global Schoolhouse Pilot Project (95:81).

The project involved American elementary through high school classes in twelve states. Students worked on four topics: alternative energy sources, solid-waste management, space exploration, and weather and natural disasters. Teachers and students exchanged messages and participated in live videoconferences over the Internet with scientists and government officials (95:81).

Don Mitchell, from the Division of Networking & Communications Research & Infrastructure at the National Science Foundation, sees the Global Schoolhouse project as

> ways to make available to teachers and students the technologies necessary to move the classroom into the community, the community into the classroom, and to create a new ethic of lifelong learning and global citizenship (95:82).

There are many projects like The Global Schoolhouse that link diverse populations of students and teachers across the globe that can be accessed on the Internet (67:np).

The Internet offers students and educators a new terrain for communication and collaboration (64:np). It is shifting school reform from student and educator isolation towards student and educator collaboration (69:5). Thousands of children in dozens of countries around the world are living the reality of the global village in personal, hands-on, interactive ways (65:np).

Information Access. The characteristics of the Information Age are increased access to databases,

libraries, and materials that were previously inaccessible (38:6). Also, the Internet makes information about the world available to schools and libraries through 'travel agents' such as Archie, Gopher, Veronica, WAIS, and the World Wide Web (61:np).

Databases can be accessd world wide by students and educators. Electronic journals, magazines, and books can be found on-line in digital text. Project Gutenberg's goal is to encourage the creation and distribution of a trillion texts by the end of 2001 (61:np).

Cornell University is working on digitizing over 100,000 volumes of books dealing with infrastructure, roads, bridges, and buildings. Yale University is converting 10,000 19th and 20th century history books to place on the Internet. Historical documents, ranging from U.S. Constitutional Convention papers to Civil War era political pamphlets are being digitized by the U.S. Library of Congress (24:1).

Educators have access to hundreds of databases for educational purposes. The Educational Resources Information Center (ERIC) is a nationwide educational database. ERIC contains over 900,000 abstracts of documents and journal articles, curriculum materials, papers, conference proceedings, literature reviews, and abstracts from 800 education-related journals (37:1).

Libraries on-line provide resources for the educational community. Catalog searches of many American academic and

public libraries, international libraries, and specialized libraries in other parts of the world are relatively easy to accomplish.

Materials and information can be extremely current, updated daily, even hourly. The Internet excels at finding information on breaking news stories, like the Oklahoma City bombing (94:107). Schools and libraries are accessing information that would never have been possible without the Web. Using the Internet, the educational community is going from being information poor to information rich (94:106).

Students are using the Internet as the major resource for research. Fillmore Central High School in Minnesota completed an interdisciplinary unit for 9th through 12th graders on AIDS/HIV. In health classes, students used the Internet as the primary resource for investigating the disease's causes and effects, testing procedures, treatments, and research into new treatment (92:11).

'Travel Agents' (Archie, Gopher, Veronica, WAIS, and WWW) help users sort through the data found on the Internet (61:12). Each are separate searching tools to help the user find information on the Internet quickly (6:239).

Archie tracks over 800 anonymous FTP archive sites containing some 1,000,000 files throughout the world (61:13). Gopher is one of the best ways to locate text-only information on the Internet. Veronica searches from 5,000-plus gopher databases (6:240). WAIS searches information within databases on the Internet (6:241). The World Wide

Web (WWW) consist of documents and links that may be searched (61:16).

Information Skills. As schools prepare students for citizenship in an Age of Information, information problem-solving skills become paramount. Living in an "information society," survival depends on the ability to locate, analyze, and use information skillfully and appropriately (39:1).

Christina Doyle, in a national Delphi study, defines Information Literacy as the ability to access, evaluate, and use information from a variety of sources (2:2). Information skills such as problem solving, decision making, critical thinking, information gathering, and sense making, prepare students to meet the demands of the Information Age (39:2).

A panel of experts participating in the Information Literacy Outcomes Measures Project concluded in 1991 that information literacy is important in producing lifelong learners, responsible citizens, and wage earners with employable skills and needs national attention(2:128).

The educational community is helping students master information skills through communications, collaboration, and cooperation projects on the Internet (67:1). Library Media programs play a central role in preparing teachers and students to become users of information resources and skills to access, process and apply information to problems and decisions (45:np).

The Internet offers a way for learners to access information from around the globe, the means to process and evaluate the information, and the means to disseminate and publish the acquired knowledge (45:2).

Issues of Concerns

As the Internet continues to grow so do the negative criticisms (89:71). Many critics view the electronic communities as misguided and dangerous escape from the problems of the real world (64:1). Educators indicate that the benefits of the Internet out-weigh the potential drawbacks over access equity and ethics (74:78).

Internet Access. Having access is cited as the obstacle teachers have the most difficulty with to overcome (43:2). Vice President Al Gore reported to the National Press Club in December, 1993 that schools have the greatest need for networking service in society(88:32). Organizations, from the federal government, state and local governments, colleges and universities, the private sector, and public libraries have worked to provide access for the educational community.

The *Federal government* has spent millions of dollars to develop the National Information Infrastructure (NII). The NII is a coalition of private and public organizations that will connect the nation's schools, businesses, hospitals, and homes (56:1). On July 26 1993, the House of Representative passed the National Information Act of 1993 (H.R. 1757). The bill supports networking applications in

educational, health care, libraries, and government information (22:1).

President Bill Clinton signed the Goals 2000: Educate America Act into law on March 31, 1994. The Goals 2000 contain provisions for educational technology to ensure that public schools will be connected to the information highway (63:1).

Many other pieces of legislation are being considered to help link the educational community to the Internet. Senator Ernest Hollings sponsored the Communications Act of 1994 (S.1822) to direct advanced telecommunications services to all public school classrooms and libraries (88:35). Senate bill 1040, Technology for Education Act of 1994 reauthorized the Elementary and Secondary Education Act (ESEA) to help poor schools acquire computer hardware and other telecommunications hardware (63:2). Congress continues to debate how to wire classrooms to have access to the Internet and the National Information Infrastructure (63:4).

President Clinton readily supports the National Plan for Educational Technology. Clinton's State of the Union speech on January 23, 1996 addressed the importance for every classroom in America to be connected to the information superhighway with computers, good software, and have well-trained teachers (59:1).

Educators can also connect to the Internet and can get information on federal grant opportunities available from

the Department of Education's Office of Educational Research and Improvement (OERI) (25:2).

States are coordinating state wide plans according to the guidelines from the Goals 2000 Act. State wide plans describe how technology will be applied to schools and strategies to learn the technology, including telecommunications and distance learning. Student achievement with technology must also be assessed by the state (63:3).

The National Information Infrastructure depend on the states to provide resources for the districts and schools so access to telecommunications and information technologies will be possible. States need to address the issues of planning for connectivity, maintenance, technical standards, and financing (62:7).

States are creating statewide electronic educational networks as a resource for educators and students. TEnet is a state wide network for educators in Texas. The WEB Associates conducted a survey and reported that 58 percent of TEnet users found the network useful in many ways (88:44).

West Virginia Microcomputer Educational Network (WVMEN) is a state wide telecommunications electronic bulletin board used by West Virginia Educational System. WMEN provides free access to educators on the bulletin board (99:18).

Local colleges and universities may offer the educational community access and training. West Virginia

University offers educators accounts through West Virginia Network for Educational Telecomputing (WVNET) service. WVNET provides access to higher education, public education, libraries, and state and local government. The service includes Internet and e-mail access (101:np).

West Virginia University received a grant to train science and math teachers, throughout the state, to enhance science/math instruction using the Internet. WV K-12 RuralNet project will train two teachers at all West Virginia Schools which have access to the Internet (73:1).

Public libraries are also providing resources for schools to access the Internet. The Whole New World project, offered by the Enoch Pratt Free Library in Baltimore, demonstrates that with high expectations and proper training, at-risk children can achieve life long knowledge through information technology (84:32).

The West Virginia Library Commission Dataline Network offers schools toll-free computer online access to all West Virgina public libraries. Users can connect to public libraries and search the holdings and request materials through the inter-library loan program.

The *private sector* is beginning to see the importance of linking schools to the Internet. In 1993, the National Coordinating Committee on Technology in Education and Training group was formed to define access requirements and priorities for the information highway. The group includes Regional Bell Operating Companies (RBOCs), the Private

Sector Council, the IBM Foundation, the Association of American Publishers, and the Association for Computing Machinery (88:35).

Telephone, cable, and telecommunication providers are providing access for schools. Every library, school (K-college), museum, and government agency in the state of New York will be linked together on the New York State Education and Research Network (NYSERNet). Two telephone services, NYNEX and Sprint, along with NYSERNet developed the electronic data network for New York (30:1).

Pacific Bell will offer links for communications and video conferencing to 7400 public K-12 schools in California. Services include wiring, free installation, and waive usage charges for one year after installation (31:1).

Bell Atlantic's World School project in West Virginia is somewhat similar to Pacific Bell's project in California. The World School project provides direct, high-speed access to all K-12 schools in the Bell Atlantic-West Virginia's service area (100:np).

Ethics. News reports and many legislators have depicted the Internet as an inappropriate tool for children. Negative television stories has portrayed the Internet as the place for pornography (47:1).

Educators are working to change the image of the Internet by developing Acceptable Use Policies, creating safe Web pages, and purchasing Internet monitoring software to screen out inappropriate items. Congress has worked to

pass a law to help regulate indecent materials on the Internet.

Acceptable Use Policies (AUPs) defines, for the student or educator, the boundaries for Internet access (47:2). AUPs are written agreement signed by students, parents, and teachers concerning rules of on-line behavior. Issues addressed in AUPs are: definition of the Internet, netiquette or conduct governing the Internet, and ethical and legal issues (36:9).

Schools need to develop policies to guide users and establish rules, and consequences for breaking them. Integrating issues, concerning the ethical use of technology, need to be part of the school's curriculum (48:13).

Web pages created by students and educators offer a safe place for students to explore the Internet. Appropriate Web sites can be selected by teachers or librarians for the users (47:1). More than 2,500 schools have registered school created Web pages on Web66 (83:1). Web66 was developed by Stephen Collins to provide educators with extensive information on using the Web and numerous tips and tools for creating Web pages (47:1).

Internet monitoring software screens out obscene items on the Internet. Most software packages block words, phrases or sites that are inappropriate for students to access (47:7).

Congress passed the Communications Decency Act and President Clinton signed the bill in January 1996. The bill criminalizes indecent speech on the Internet. CDA's supporters feel that the law was necessary to protect children using the Internet (71:1).

Conclusion

Thousands of children in dozens of countries around the world are living the reality of the global village in personal, hands-on, and interactive ways (65:1). The Internet has changed the way teachers teach and the way students learn, creating a new paradigm for the educational community. Information access and management skills are what students will need to compete in the work-place of tomorrow (74:82).

The Internet expands classroom resources by making information and people from all over the world available to students, teachers, and media specialist. Internet access provide professional collaborations among educators, student collaborative investigations, access to experts in every content area such as a scientist, access to libraries and databases, access to computing resources and software, collaborative development and electronic delivery of instructional materials, teacher education enhancement, and electronic publishing of students' projects.

Working together, nationwide, equitable access and ethical use of the Internet can be achieved for the educational community. Bell Atlantic's 'World School'

initiative will help West Virginia schools to achieve a national leadership postion through its program. With high speed access teachers, library media specialists, students will electronically go beyond the four walls of the classroom to access global learning resources.

CHAPTER 3

Methods and Procedures

Methodology

Descriptive survey was the research methodology used for data collection.

The purpose of the survey was to determine the impact of the Internet on teaching and learning in education. Two separate surveys were used, one survey for teachers and library media specialists (Appendix A, page 78) and one survey for students (Appendix B, page 80), to acquire data describing the effects of the Internet.

Population

The population surveyed included a random sample from two hundred and fifty teachers, thirty five library media specialists, and one hundred and fifty students with e-mail accounts provided by Bell Atlantic's World School Program in West Virginia. A simple random sampling, from each of the three groups, was used for data collection.

Data Collection

E-mail addresses were acquired from accessing the West Virginia K-12 Access server which is part of the World School Program. The surveys were e-mailed to teachers, library media specialists, and students in September 1996.

A request for permission to administer the survey to K-12 Access users was made to Bell Atlantic's World School program administrator, Joe Long.

The surveys contained a brief statement of the reason for the research along with procedures for completion. Respondents were given the option of receiving a copy of the results as an appreciation for participating in the survey.

Participants were requested to return the survey by e-mail within a three week period.

Data Analysis

The results of the data were divided into three groups; teachers, library media specialists, and students. Data were also combined for an overall interpretation.

The responses were calculated on a percentage basis for each question. A comparison of the responses was made between teachers, library media specialists, and students. Each hypothesis was tested by using percentages from each group. The participants responded to the survey with a yes or no answer, a rating from one to five, with one being the lowest rating and five being the highest rating, or gave a no response (NA).

Graphs were constructed to show the results of each participating group's responses to each question surveyed. A final graph was constructed to show the overall results of each question.

Chapter 4

Analysis of Data

Introduction

The purpose of the study is to find out the impact of the Internet on teaching and learning in education as perceived by teachers, library media specialists, and students participating in Bell Atlantic's 'World School' program in West Virginia schools.

Questions 3 and 15 are a yes or no response and questions 4 through 14 are scaled from 1 to 5 with 1 being the lowest rating and 5 being the highest rating. NA represents not applicable or no response. Figures 4-14 display the responses of teachers, library media specialists, and students' use of the Internet; activities for their effectiveness; behaviors of students; and overall effective educational resource. Although it is difficult to adequately summarize the results, the major points are listed below in six main groups; demographics, use, activities, behaviors, effectiveness, and comments.

Demographic Summary of Respondents

In September 1996, a copy of the survey found in Appendix A, page 78 was e-mailed to 250 teachers and 30 library media specialists. Also, a copy of the survey found in Appendix B, page 80 was e-mailed to 150 students. Surveys were returned via e-mail within three weeks by 87 teachers, 14 library media specialists, and 63 students.

Therefore, 34.8% of teachers, 46.66% of library media specialists, and 42% of students responded to the survey.

Questions 1 and 2 of the survey relate to the demographic data on respondents. Responses provided information on geographic location by county of the state and grade level distribution of teachers, library media specialist, and students.

Responses to question 1 indicated that 61.88% of the 55 West Virginia counties were represented in the survey results. Figure 1 illustrates that 34 counties were represented; students from a total of eight counties, or 14.55%, were represented, media specialist with a total of 10 counties or 18.18% represented, and teachers from a total of 30 counties, or 54.54% were represented. No responses to question 1 were returned by nine teacher surveys.

Responses to question 2 indicate that a large majority (55.49%) of the survey respondents were from the 9-12 level. Figure 2 illustrates the percentage of respondents from each grade level.

Of the 164 respondents who indicated grade level, 17.07% represented K-4 school level, 25% represented 5-8 school level, and 55.49% represented 9-12 school level. Figure 2 illustrates the percentage of response for each grade level group.

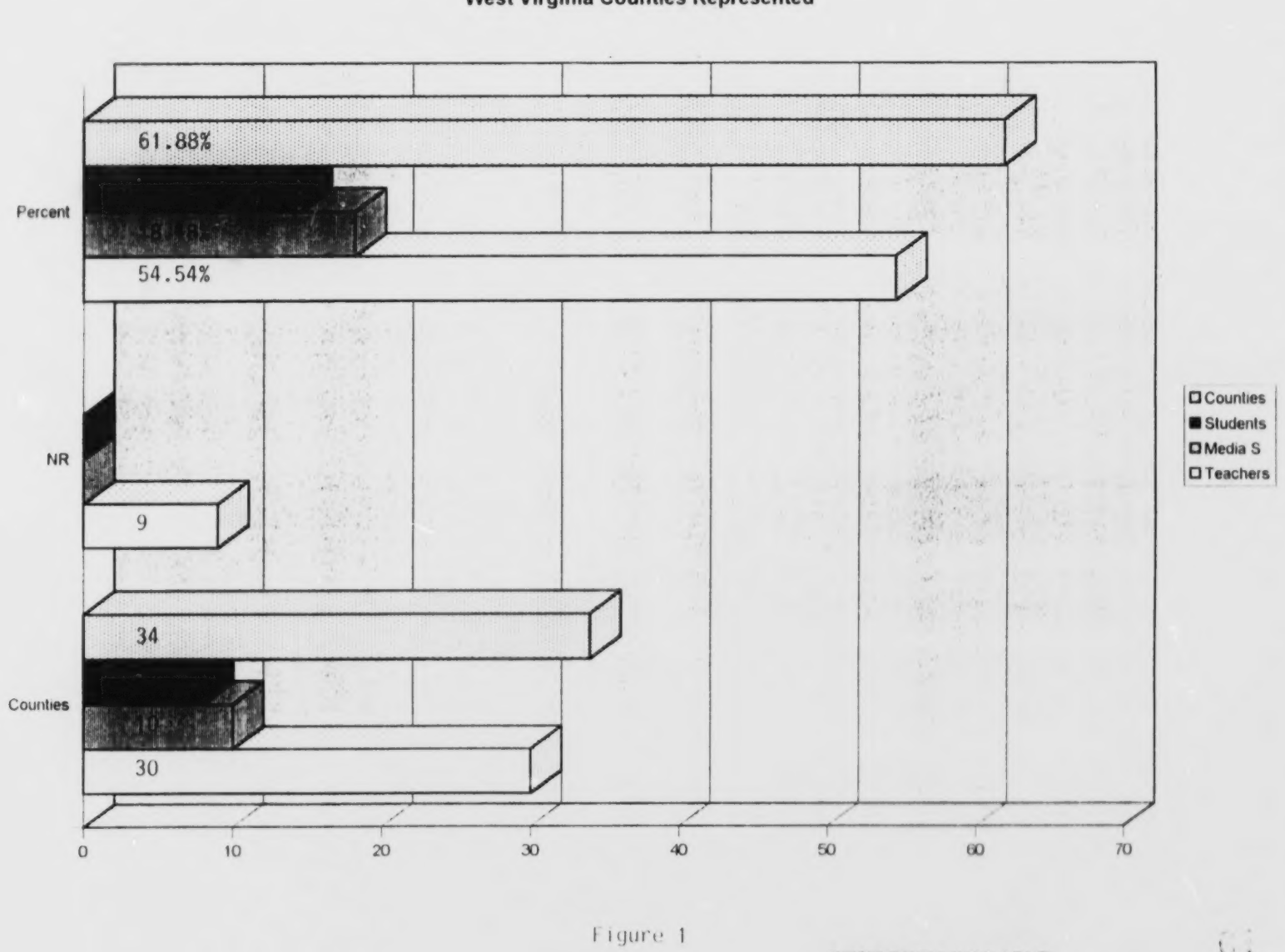

Figure 1

BEST COPY AVAILABLE

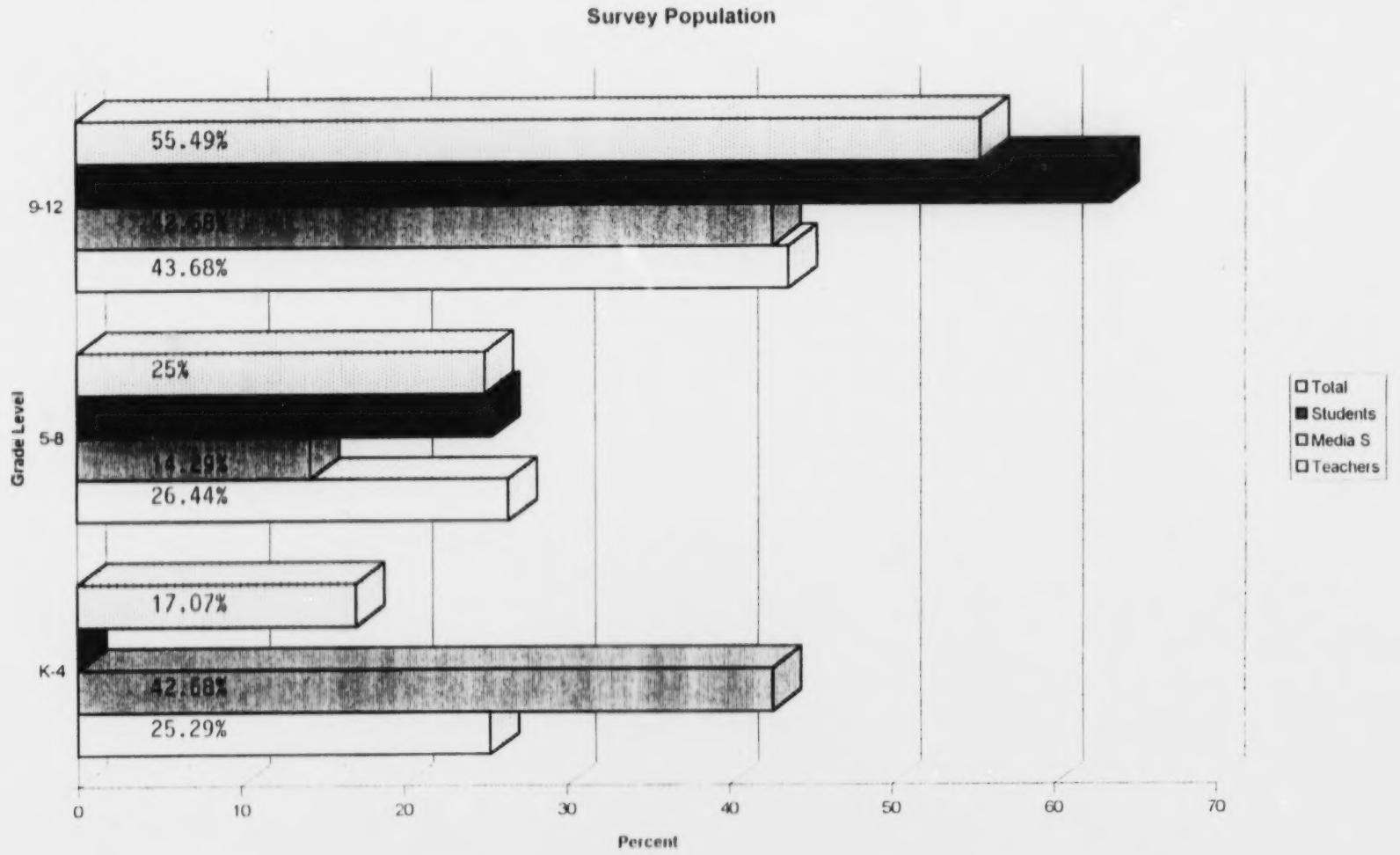

Figure 2

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Internet Use

Question 3, 4, and 5 of the survey focused on respondents' use of the Internet, students learning, and compatibility with curriculum.

Data from question 3, illustrated in Figure 3, indicate that 80.49% of participants used the Internet in some capacity. Students used the Internet more than the other participants at 100%, with 71.43% library media specialists and 67.82% of teachers surveyed using the Internet.

Respondents gave the highest ranking of 5 to question 4, illustrated in Figure 4, with 29.88% indicating that students learning did increase with the use of the Internet.

According to Figure 5, 32.32% of the participants agree that the information from the Internet was compatibility with the curriculum/subject matter being used. The highest ranking of 4 was given by 46.03% of the students with the lowest ranking of 1 was given by 1.15% of teachers.

Internet Activities

This section examines data gathered in response to questions 6 through 10 of the survey relating to the Internet activities and their effectiveness. Responses provided information on informational retrieval, interactive projects, collaboration with specialists, collaboration with colleagues and peers, and others specified by the participants.

Information retrieval received the highest ranking of 5 for most effective Internet activity of 34.76% and

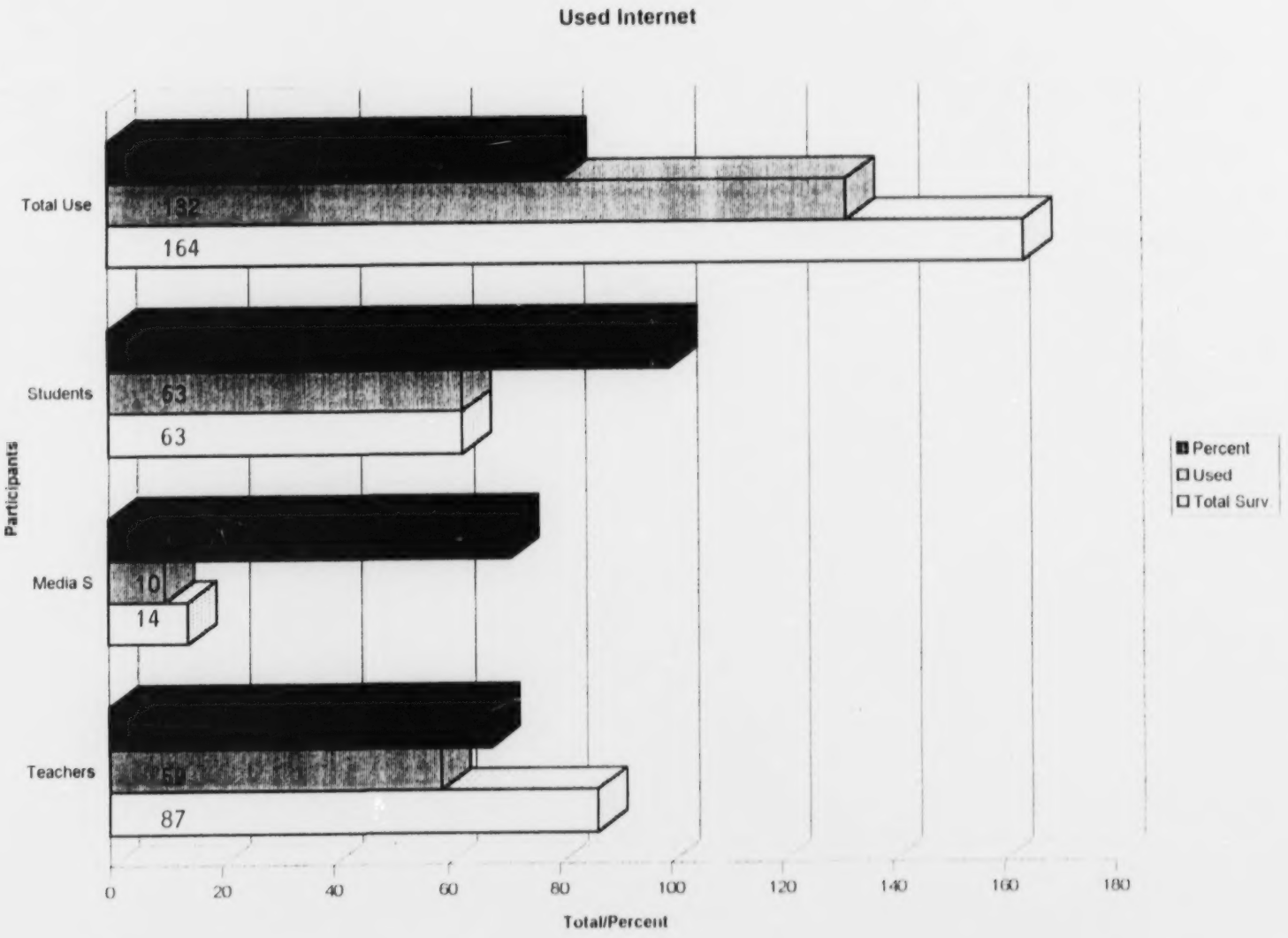
Used Internet
Total Use
132
164
Students
63
63
Media S
10
14
Teachers
50
87
Participants
0
20
40
60
80
100
120
140
160
180
Total/Percent
Percent
Used
Total Surv

Figure 3

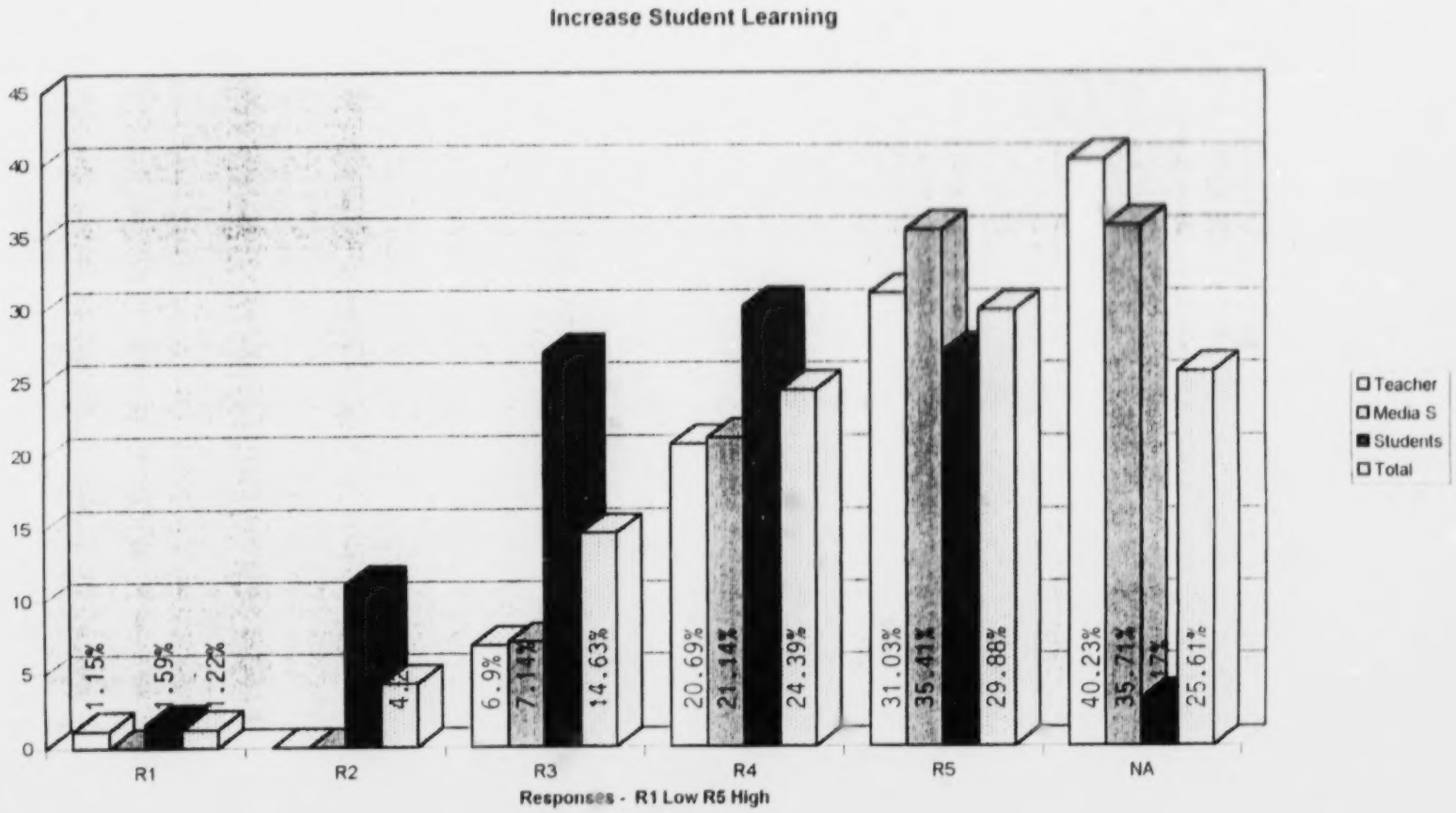

Figure 4

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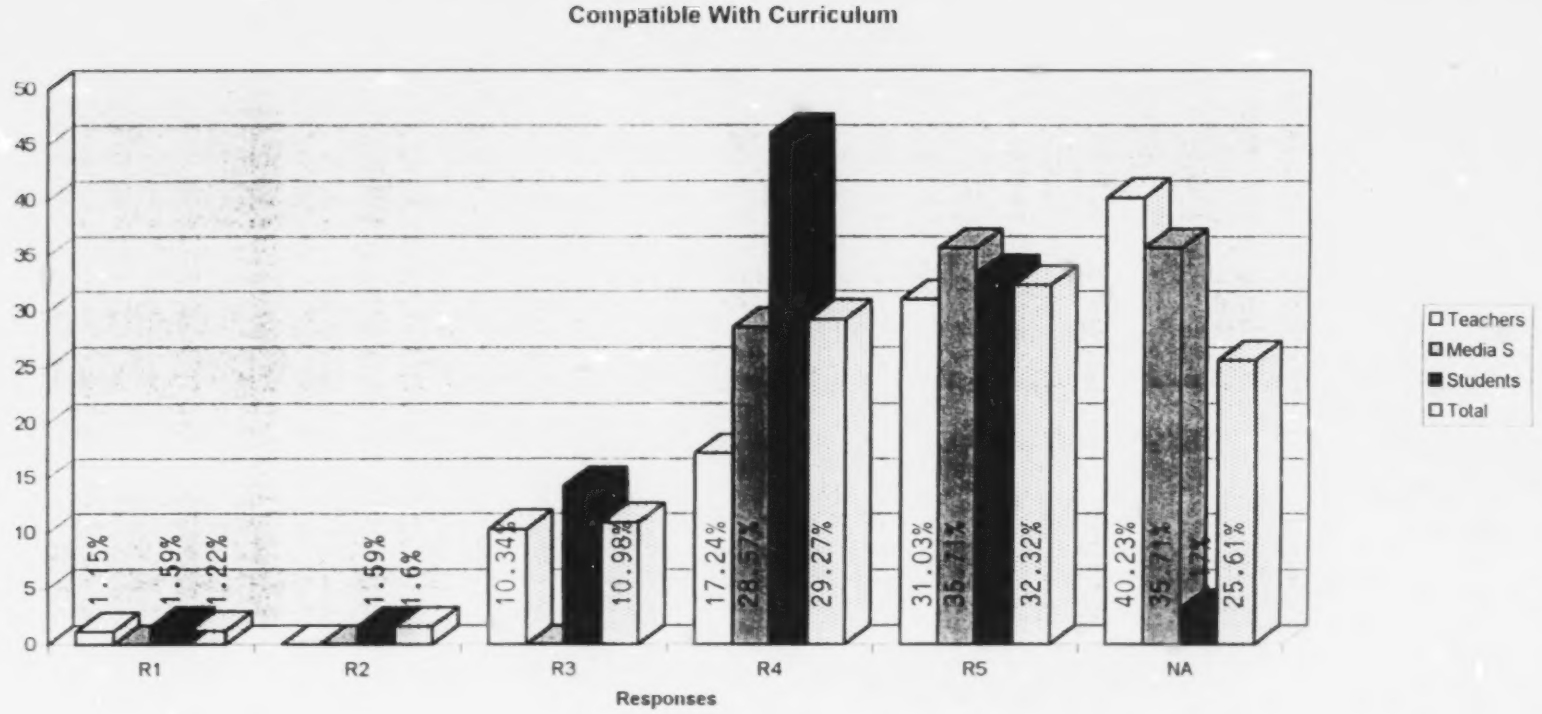

Figure 5

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collaboration with specialist received the lowest ranking of 5 for the least effective Internet activity of 14.29% among the participates.

Figure 6 indicates that the respondents gave the highest ranking of 5 or a total 34.76% for informational retrieval effectiveness. The highest ranking of 5 was indicated by each participating group as 41.27% of students, 31.03% of teachers, and 28.57% of library media specialists preferred.

Data for question 7, 8, and 9, as illustrated in Figure 7, 8, and 9, indicate that a large number of respondents did not participate in any of these activities. Collaboration with information specialist received the highest non use at 54.27%; interactive projects with groups in distant locations received the second highest non use at 52.44%; and collaboration with colleagues and peers at 43.9% non use.

Respondents who did participate in the activities in question 7, 8, and 9, gave the highest ranking of 5 or 22.22% for the interactive projects; highest ranking of 4 or 20.63% for the collaboration with specialists; and highest ranking of 5 or 28.57% for the collaboration with colleagues or peers.

Few respondents, as illustrated in Figure 10, (4.27%) listed other activities not included in the survey.

Behaviors Observed

The questions (11, 12, 13, and 14) in this cluster focused on four behaviors observed while students used the

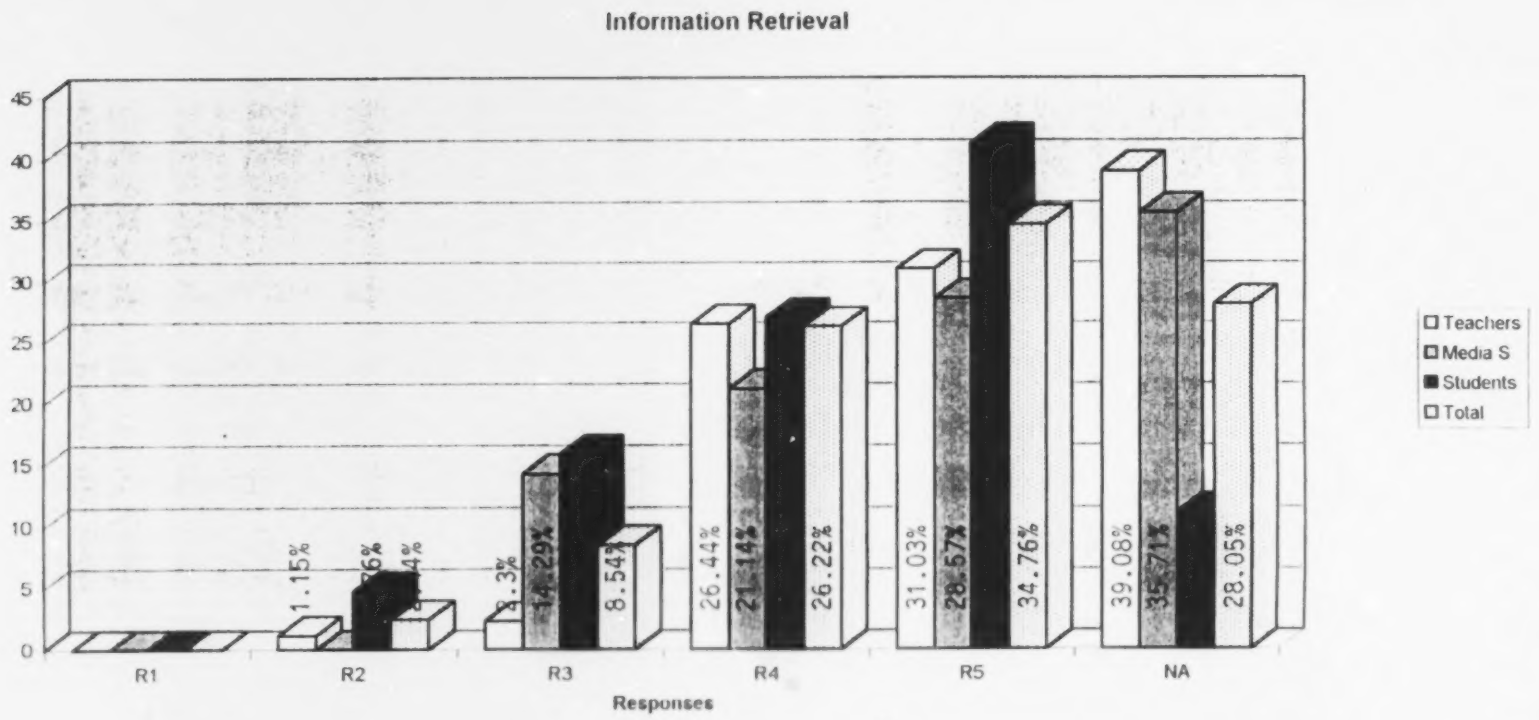

Figure 6

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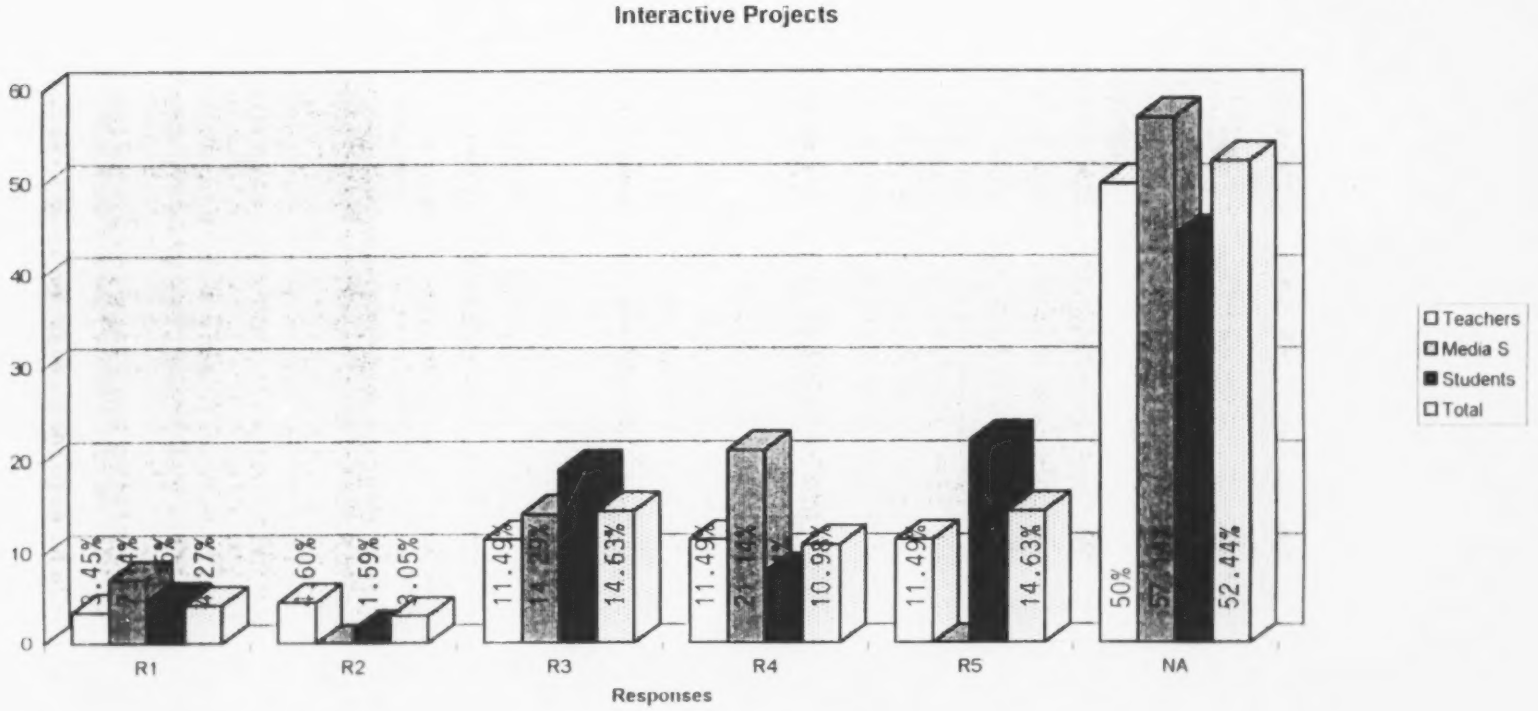

Figure 7

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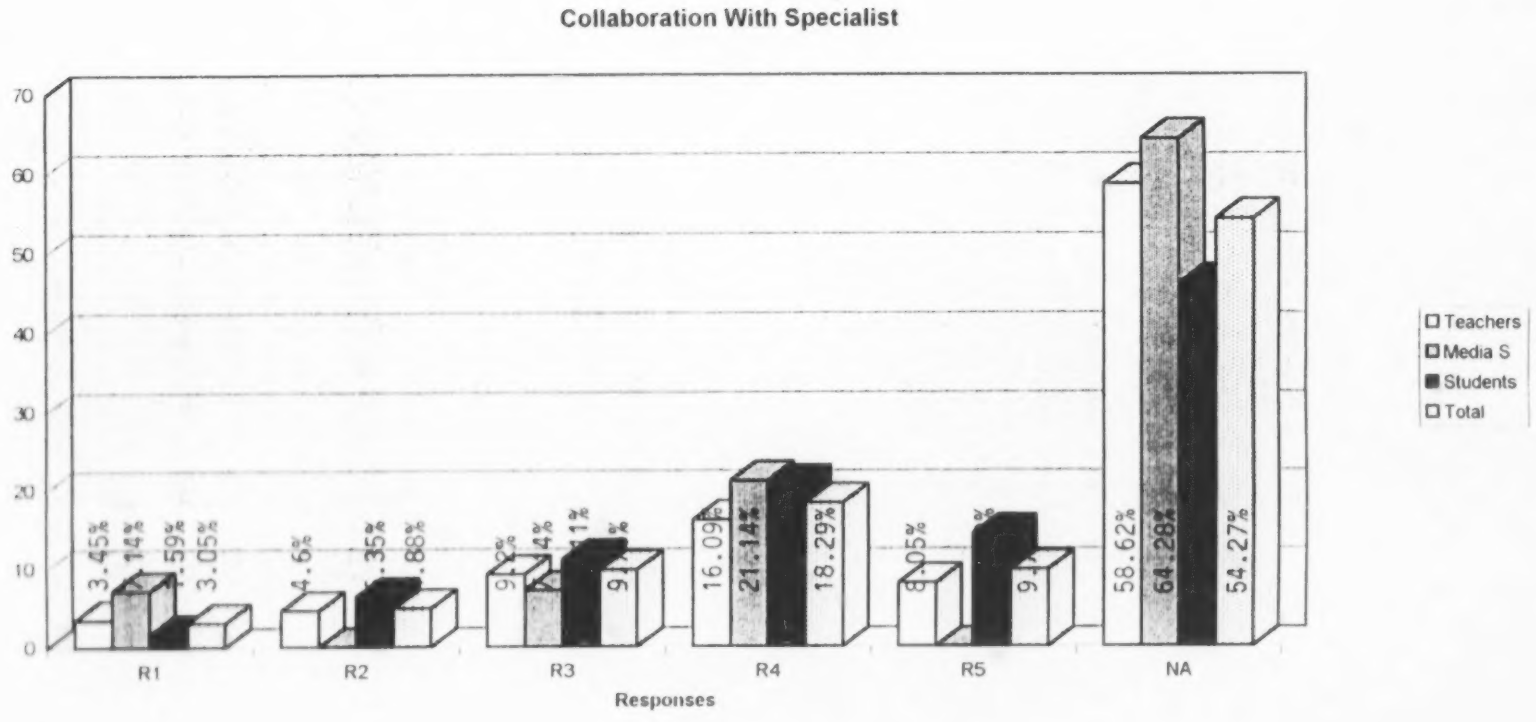

Figure 8

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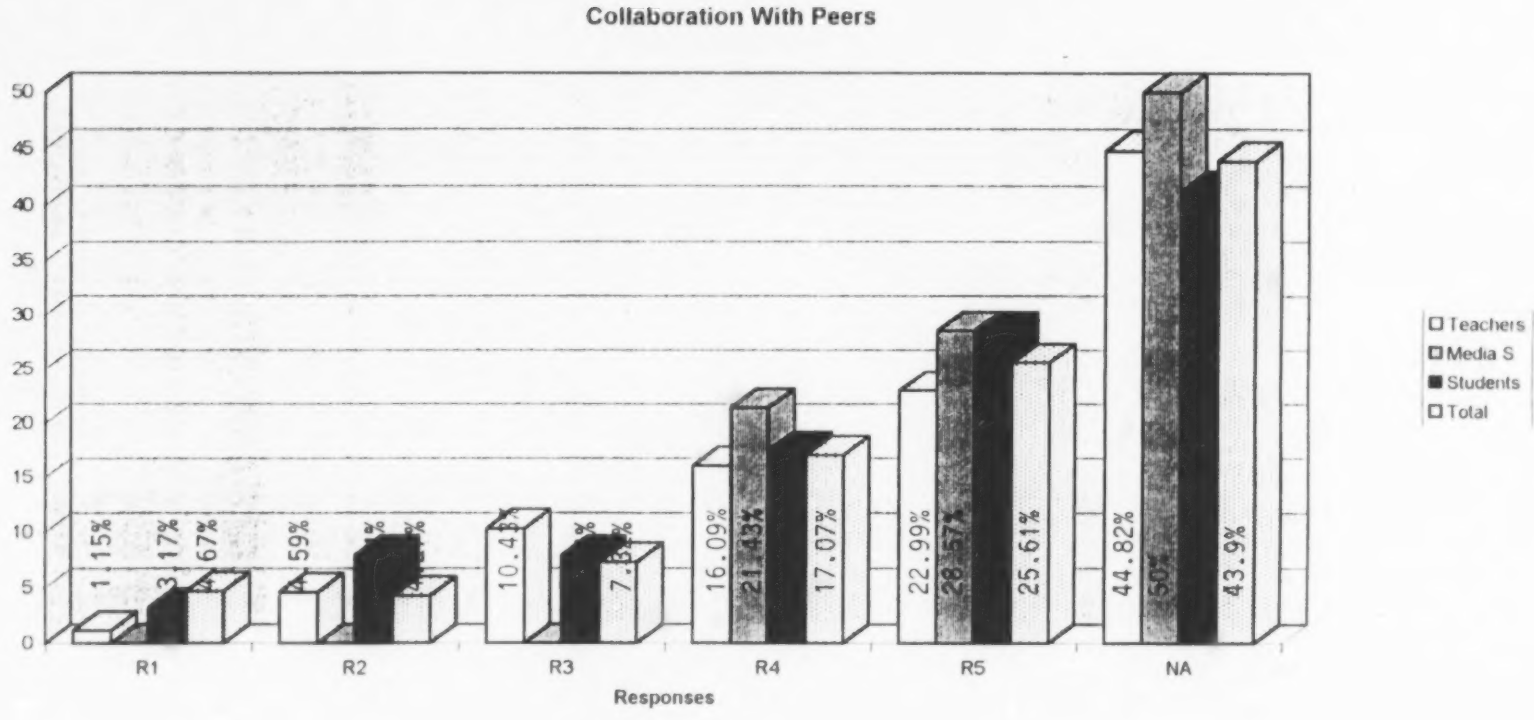

Figure 9

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76

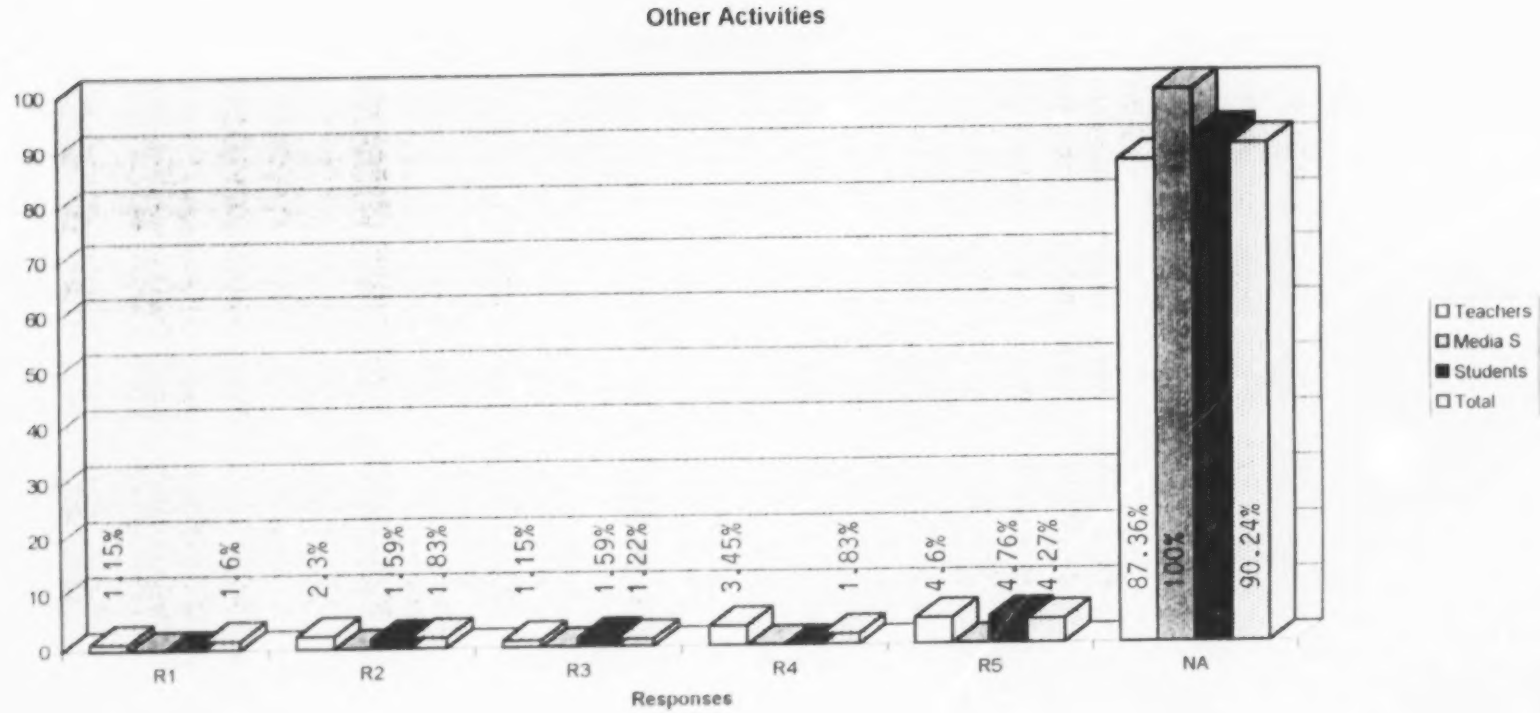

Figure 10

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Internet and how students perceive the behaviors: reluctant learners are more involved, see increased enthusiasm for learning, students work better with others, better speaking and writing skills.

Question 12, most students demonstrated an increased enthusiasm for learning (Figure 12), received the highest rating of 5 at 34.15% and question 14, students have better speaking and writing skills (Figure 14), receive the lowest rating of 5 at 9.76% change in behavior.

Data for question 11, as illustrated in figure 11, shows students with the highest ranking of 4 or 31.75%, believing that reluctant learners become more involved with the use of the Internet. Teachers and library media specialists also rank question 11 with a 4 (26.44%) and 5 (28.57%) respectively.

All respondents to question 13 (Figure 13) indicated that students work better with other class members while working on the Internet. Students gave the highest ranking of 5 at 33.33%, library media specialists at 28.57%, and teachers at 14.94%.

Effective Educational Resource

The concluding question asserts that 78.05% of the respondents assert that the Internet is an effective educational resource. Figure 15 shows students with the highest percentage at 92.02%, followed by library media specialists at 78.57% and teachers at 57.82%.

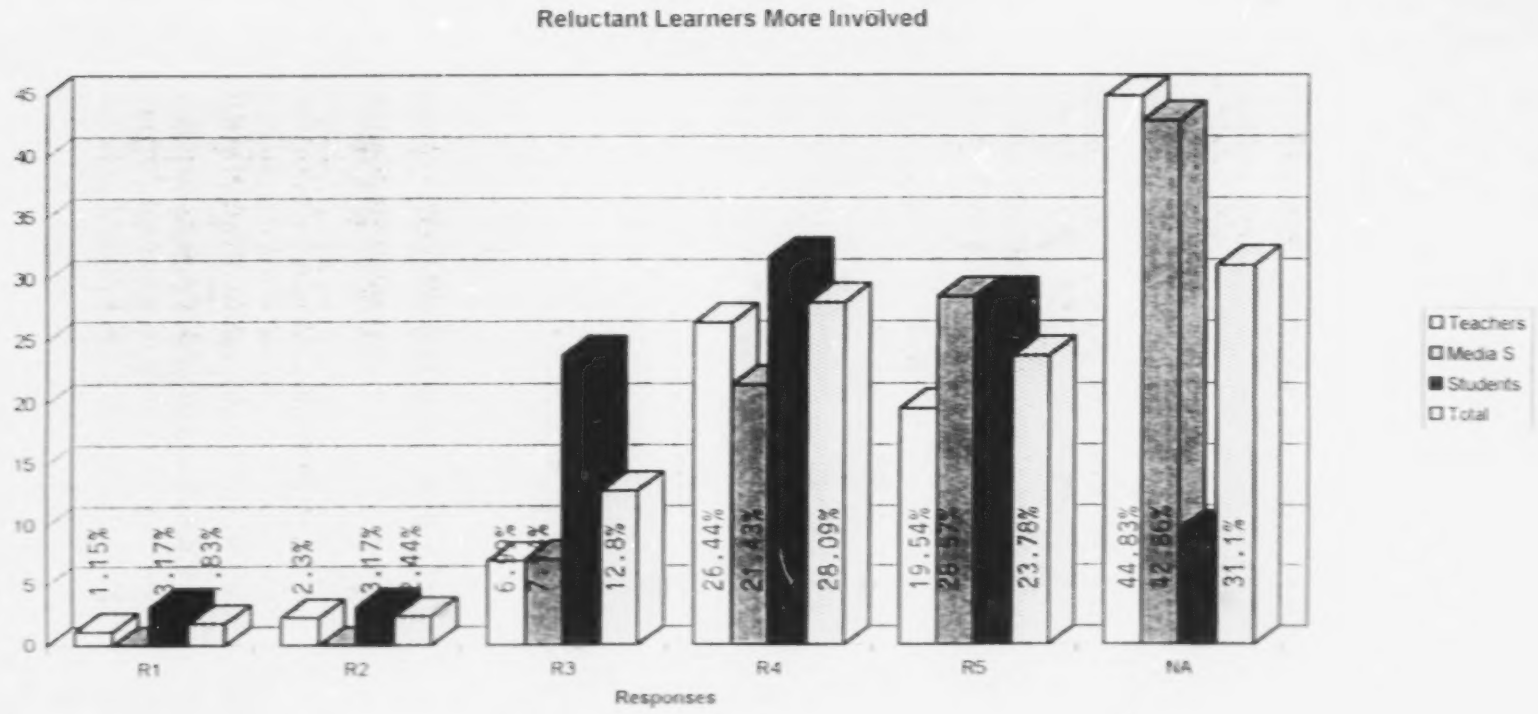

Figure 11

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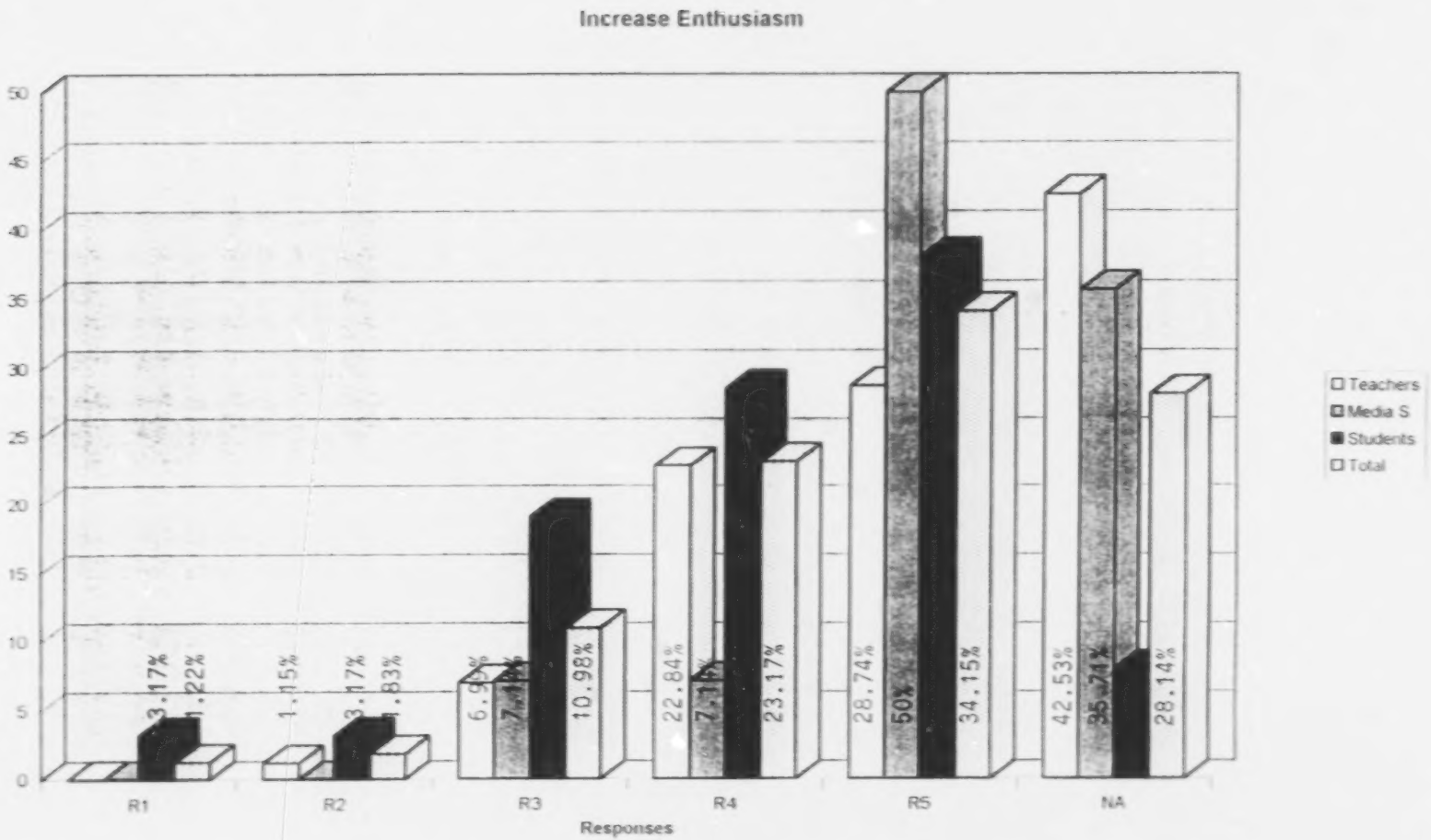

Figure 12

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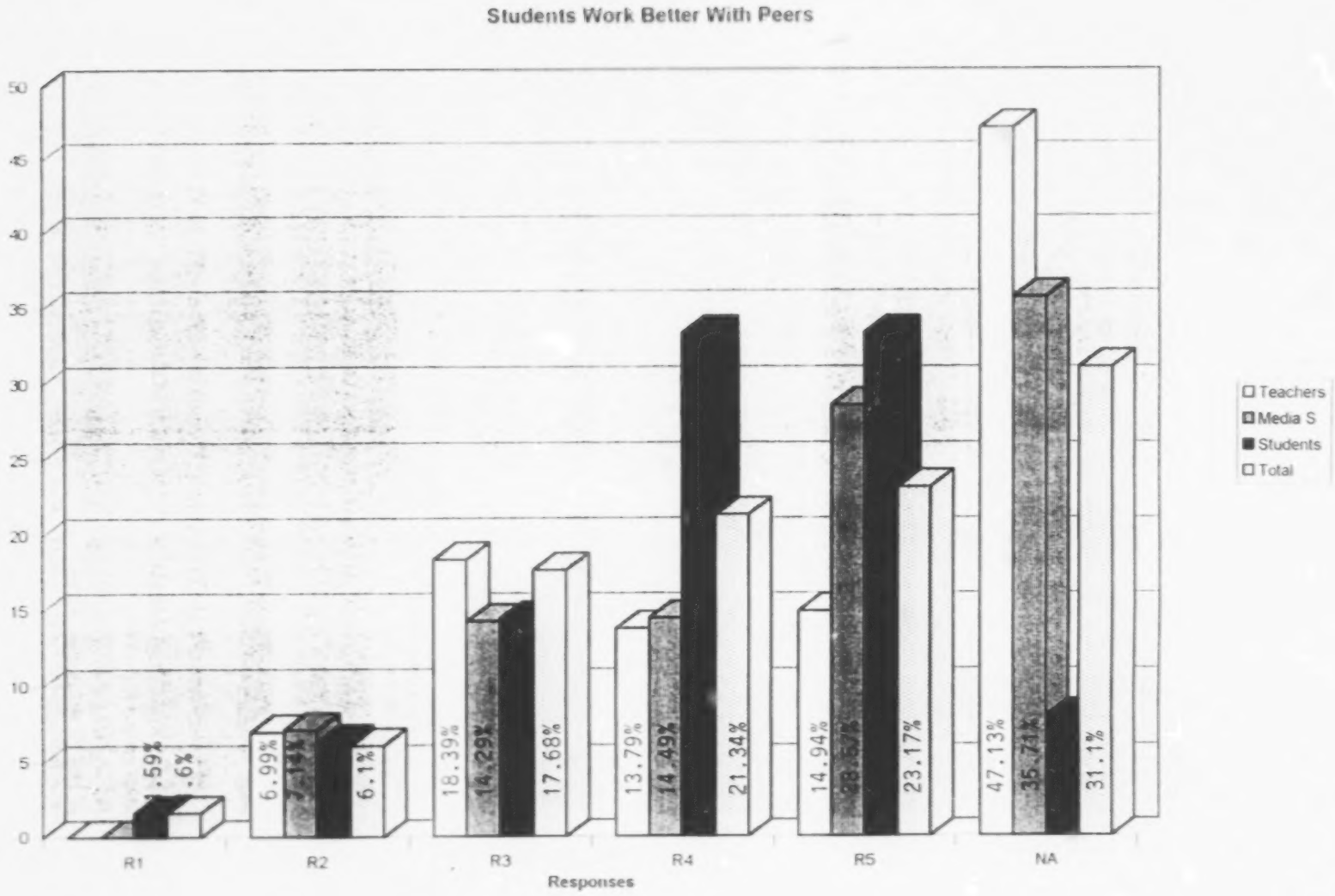

Figure 13

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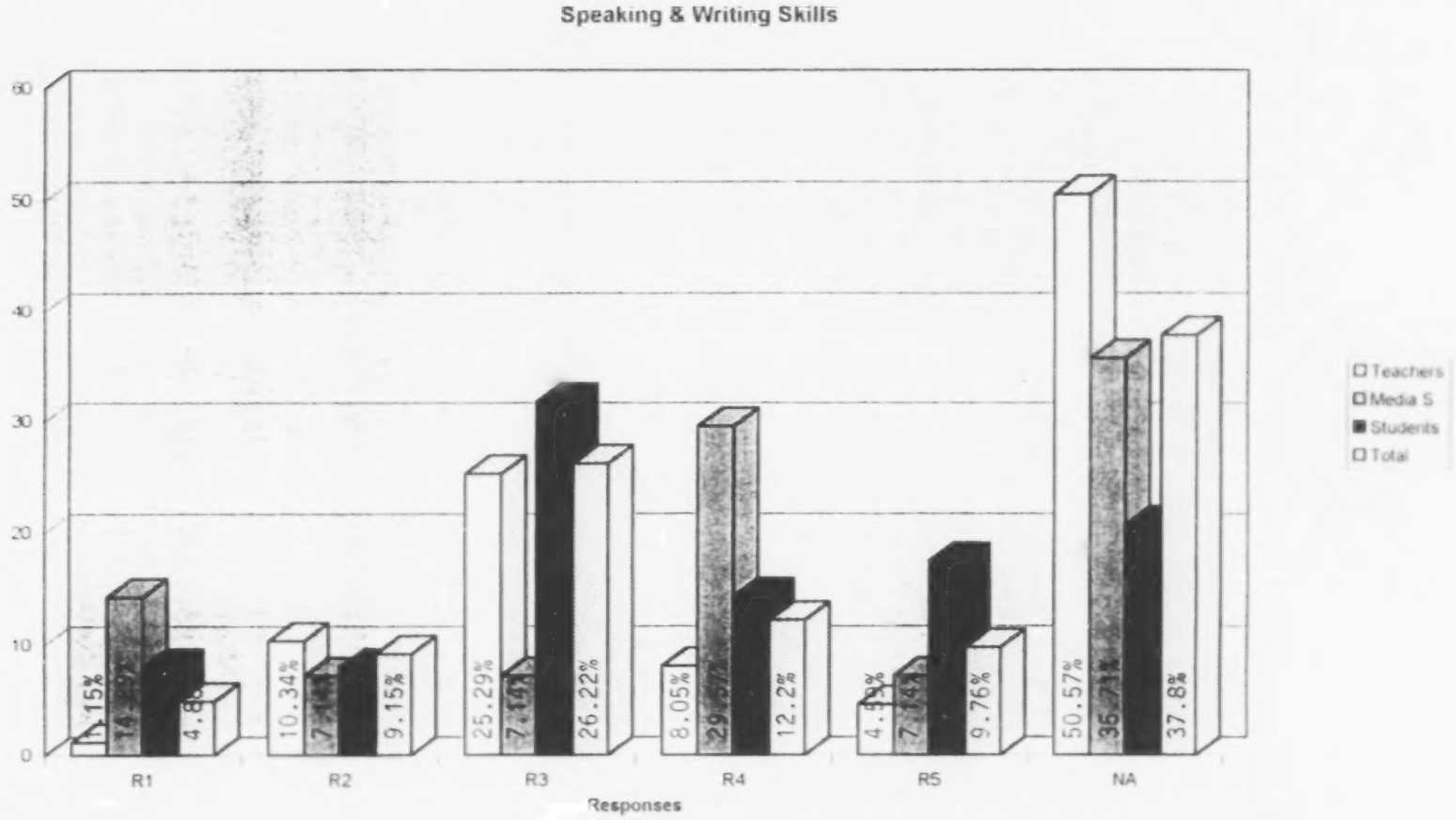

Figure 14

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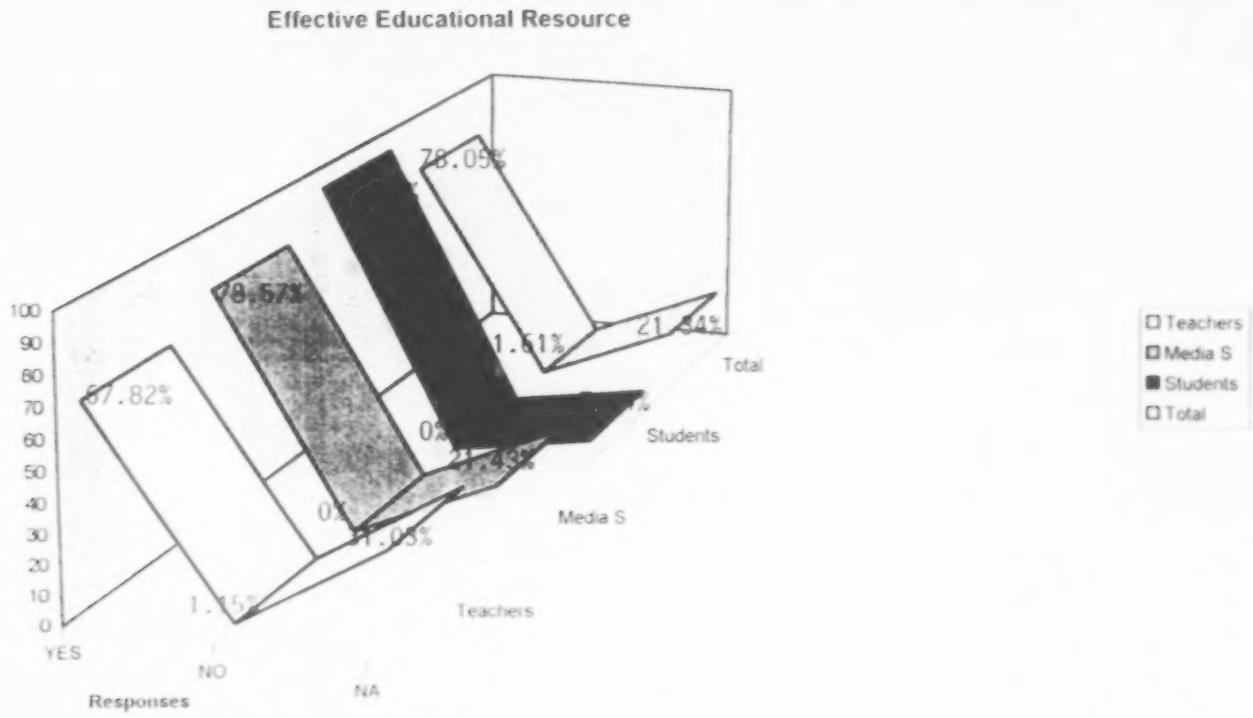

Figure 15

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The second part of question 15 asked why the respondent did or did not feel that the Internet was an effective educational resources. One hundred and twenty eight (78.05%) of the respondents made comments. Positive comments were made by 82.54% of students, 78.57% of library media specialists, and 74.71% of teachers. One negative comment (1.15%) was made by a teacher.

The most frequently mentioned positive comment (60.94%) was the use of the Internet for information retrieval. The following comments illustrate the respondents remarks:

Teachers (64.62%) -

- "Students have the opportunity to access information that would be unavailable in our community."
- "Give them more answers than they ever dreamed of getting, its like having another teacher in the room."
- "It's like a library that never closes."

Library Media Specialists (54.54%) -

- "Offers up-to-the minute news, weather, etc. Offers information not available from local library."
- "Number of resources available, school could never afford current data."

Students (57.695) -

- "Provides us with more information than most students have access to."
- "Look at all the references and search tools that are available now."
- "Maximizes time, give more info than anything else."

Participants ranked (21.03%) the Internet high as a motivational tool. The following comments illustrate the respondents remarks:

Teachers (16.92%) -

* "Students have the thrill of seeing info about themselves appear on the Net."
* "It give the students something new and exciting to work with. They are learning without actually realizing that they are.

Library Media Specialists (27.27%) -

* "More hands on ways to explore increasing self esteem."
* "Piques students interest."

Students (25%) -

* "It is more fun than going to the library and we are probably more likely to use this tool."
* "People are more interesting on the Internet than in a book."

Other notable comments made by the respondents:

Teachers -

* "Use to e-mail colleagues, background info on on experiments."
* "Can go on field trips without spending money."
* "Connects students in rural areas to the world."

Library Media Specialists -

* "World wide connections."
* "Searching skills can be developed."

Students -

- "Learn about other states and talk to different people."
- "Get a chance to learn things."
- "A tool to educational things in the world."

Comments

No comments were made by the participants concerning how the Internet might be used to innovate the educational system.

Chapter 5

Summary, Conclusions, and Recommendations

Summary

Bell Atlantic, through the 'World School' initiative, has connected over three hundred of the seven hundred schools in West Virginia to the Internet. Over seven thousand educators have completed Internet training approved by the West Virginia Department of Education to help with utilization of the resource in the schools curriculum. Through the 'World School' program, a new global world rich in educational resources is now available to West Virginia teachers, library media specialist, and students.

From the overall view of opinions, as illustrated on figure 16, the results show that in all areas except question 14, students have better speaking and writing skills (it ranked a three), the respondents, on a scale of one to five rated the Internet use above four. This indicates that the Internet has a significant impact on teaching and learning in education by teachers, library media specialists, and students participating in Bell Atlantic's 'World School' program in west Virginia schools.

Conclusions

The following conclusions are based on the results of the survey.

1. Teachers felt a positive impact on teaching and education through the use of the Internet.

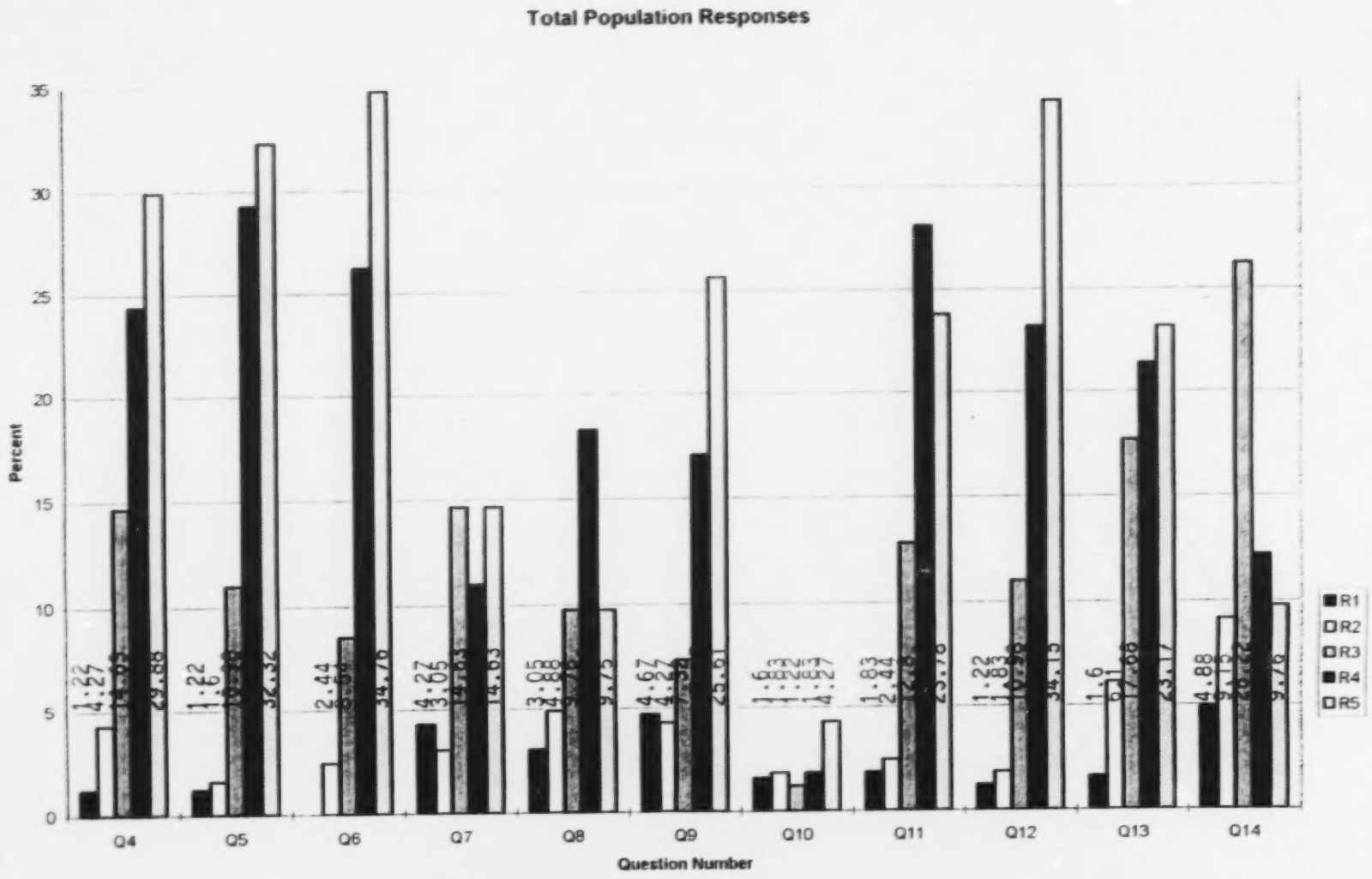
Total Population Responses
Percent
35
30
25
20
15
10
5
0
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Question Number
R1
R2
R3
R4
R5

Figure 16

2. Library Media Specialists felt a positive impact on teaching and education through the use of the Internet.

3. Students felt a positive impact on learning and education through the use of the Internet.

The review of literature indicates that the impact can only be achieved if teachers are adequately trained, the school has a precise direction, and the Internet activities are well-integrated into the curriculum.

Recommendations

1. Conduct a study that measures the effect of the Internet on student learning through test scores.

2. A means of comparing behavioral improvement between traditional activities and Internet activities should be devised and tested.

3. Use a larger number of teachers, library media specialists, and students and not limit the participants to those who have e-mail accounts.

4. Include parents' point of view in a survey.

TEACHER SURVEY
USE OF THE INTERNET IN EDUCATION

Dear Teacher,

Following is a brief survey to be used in helping to determine the educational value of the Internet. Your participation in completing this survey is greatly appreciated. I will supply a copy of the results of this survey to all participants who request them.

---

1. County and school where you currently teach.

2. What grade level/subject do you teach? K-4 5-8 9-12
   Subject -

3. Have you used the Internet in a teaching/learning environment?
   Yes No

   If yes, please continue to answer the rest of this questionnaire.
   If no, in what educational setting to you use the Internet?

Please rate the following questions about your use of the Internet in the classroom or media center with 1 being the lowest rating and 5 being the highest. Place an X in the box below your rating.

	1	2	3	4	5	N/A
4. Did the experiences on the Internet increase student learning?						
5. Was the Internet information compatible with your curriculum?						

Rate the following Internet activities for their effectiveness.

	1	2	3	4	5	N/A
6. Information retrieval.						
7. Interactive projects with groups in distant locations.						
8. Collaboration with information specialists (Ask a Scientist, etc.).						
9. Collaboration with colleagues.						
10. Other (Please specify).						

Rate the following behaviors that you observed while your students were on the Internet.

	1	2	3	4	5	N/A
11. Reluctant learners became more involved.						
12. Most students demonstrated an increased enthusiasm for learning.						
13. Students work better with other class members.						
14. Students have better speaking and writing skills.						

---

15. Overall, do your feel that the Internet is an effective educational resource?

[ ] Yes - Why? _____

[ ] No - Why? _____

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16. Please make any comments concerning how the Internet might be used to innovate the educational system.

Would you like a copy of the results? Yes No

If Yes, please give e-mail address _____

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STUDENT SURVEY
USE OF THE INTERNET IN EDUCATION

To students,

The following is a brief survey to be used in helping to determine the educational value of the Internet. Your participation in completing this survey is greatly appreciated. I will supply a copy of the results of this survey to all participants who request them.

---

1. County and school where you currently attend.

2. What grade are you in? K-4 5-8 9-12

3. Have you used the Internet in a classroom/computer lab/library media center.
Yes ( ) No ( )

If yes, please continue to answer the rest of this questionnaire.
If no, in what educational setting to you use the Internet?

Please rate the following questions about your use of the Internet in the classroom or media center with 1 being the lowest rating and 5 being the highest. Place an X in the box below your rating.

	1	2	3	4	5	N/A
4. Did the experiences on the Internet increase your learning?	( )	( )	( )	( )	( )	( )
5. Was the Internet information compatible with your school work?	( )	( )	( )	( )	( )	( )

Rate the following Internet activities for their effectiveness.

	1	2	3	4	5	N/A
6. Information retrieval.	( )	( )	( )	( )	( )	( )
7. Interactive projects with groups in distant locations.	( )	( )	( )	( )	( )	( )
8. Collaboration with information specialists (Ask a Scientist, etc.).	( )	( )	( )	( )	( )	( )
9. Collaboration with other students.	( )	( )	( )	( )	( )	( )
10. Other (Please specify).	( )	( )	( )	( )	( )	( )

Rate the following behaviors that you observed while your students were on the Internet.

	1	2	3	4	5	N/A
11. More involved with class assignments.	( )	( )	( )	( )	( )	( )
12. More enthusiastic about learning.	( )	( )	( )	( )	( )	( )
13. Work better with other class members.	( )	( )	( )	( )	( )	( )
14. Have better speaking and writing skills.	( )	( )	( )	( )	( )	( )

---

15. Overall, do your feel that the Internet is an effective educational resource?

( ) Yes - Why?_____

( ) No - Why?_____

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14. Please make any comments concerning how the Internet might be used to improve the educational system.

Would you like a copy of the results? yes no

If yes, please give e-mail address _____

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